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CATALOGUE

OF THE

MINERAL COLLECTIONS

IN THE

MUSEUM OF PRACTICAL GEOLOGY,

WITH INTRODUCTORY AND EXPLANATORY REMARKS.

BY

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AND

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MINERAL DEPT.

NOTICE.

It has long been my anxious desire that Catalogues of the contents of the various Departments of the Museum of Practical Geology should be published. One of these Catalogues, that of the Rock Specimens, as prepared by Professor Ramsay, was issued in April, 1859, and has been found so useful that a third edition has been printed. Date of title-page is 1858.

The present Catalogue of the Minerals and Ores has been composed under the direction of Mr. Warington Smyth, and the explanations to the various groups of Specimens have been voluntarily contributed by that able Mineralogist, in the midst of his arduous public duties.

To him and to Mr. Trenham Reeks, the Curator of the Museum, I feel deeply indebted for their assiduous labour in completing the work, as well as to Mr. F. W. Rudler, the Assistant-Curator, who has so accurately labelled and neatly placed the Specimens, and has also materially assisted in passing the sheets through the press.

A Catalogue of the Collection of Organic Remains in the Museum, with an explanatory preface, by Professor Huxley, and a descriptive Catalogue of the Mining, Metallurgical, and Geological Models by Mr. H. Bauerman, are in the press, and will shortly be published.

RODERICK I. MURCHISON,

Director.

Museum of Practical Geology, Jermyn Street.
November, 1864.

CONTENTS.

Page

INTRODUCTION - - - - - - - - - 1

BRITISH ORES, WESTERN SIDE.

Wall-cases 1 to 14.

COPPER - - - - - - - - - 2 to 16
- Native Copper - - - - - - - - 3
- Red and Black Oxides - - - - - - - 5
- Blue and Green Carbonates - - - - - - 6
- Silicate of Copper - - - - - - - 6
- Arseniates of Copper - - - - - - - 7
- Phosphate of Copper - - - - - - - 8
- Copper Glance - - - - - - - - 8
- Copper Pyrites - - - - - - - - 9
- Purple Copper Ore - - - - - - - 14
- Tennantite - - - - - - - - 15
- Fahlerz and Bournonite - - - - - - - 16

TIN - - - - - - - - - 16 to 19
- Oxide of Tin - - - - - - - - 16
- Stream Tin - - - - - - - - 18
- Tin Pyrites - - - - - - - - 19

BISMUTH - - - - - - - - - 19
- Native Bismuth - - - - - - - - 19
- Sulphide of Bismuth - - - - - - - 20

NICKEL AND COBALT - - - - - - - - 20

WOLFRAMIUM OR TUNGSTEN - - - - - - - 21

ZINC - - - - - - - - - 21 to 24
- Blende - - - - - - - - - 22
- Silicate of Zinc - - - - - - - - 23
- Carbonate of Zinc - - - - - - - 23

CADMIUM - - - - - - - - - 23

MANGANESE - - - - - - - - - 24
- Oxides of Manganese - - - - - - - 24
- Silicate and Carbonate of Maganese - - - - - 25

URANIUM - - - - - - - - - 25

VANADIUM - - - - - - - - - 26

TITANIUM - - - - - - - - - 26

MOLYBDENUM - - - - - - - - - 26

CHROMIUM - - - - - - - - - 26

Page

ANTIMONY - - - - - - - - - 26
GOLD - - - - - - - - - - 27
SILVER - - - - - - - - - 27
ARSENIC - - - - - - - - - 28

BRITISH ORES, EASTERN SIDE.

Wall-cases 43 to 56.

LEAD - - - - - - - - - 29 to 36
Galena - - - - - - - - - 29
Anglesite, &c. - - - - - - - - 35
Cerussite - - - - - - - - - 36
Pyromorphite, &c. - - - - - - - 36
IRON - - - - - - - - - 37 to 59
Iron Pyrites - - - - - - - - 38
Vivianite - - - - - - - - 39
Mispickel, Pharmacosiderite, &c. - - - - - - 40
Magnetic Iron Ore - - - - - - - 40
Red Hæmatite - - - - - - - - 41
Brown Iron Ore - - - - - - - - 43
Spathose Iron Ore - - - - - - - 47
Black-band Ironstone - - - - - - - 47
Clay Ironstones - - - - - - - 48
South Wales - - - - - - 49
North Wales - - - - - - 54
Shropshire - - - - - - 54
South Staffordshire - - - - - 54
Warwickshire - - - - - - 55
North Staffordshire - - - - - 56
Yorkshire - - - - - - 56
Derbyshire - - - - - - 57
Northern Counties - - - - - 59

FOREIGN ORES.

Wall-cases 15 to 23.

COPPER - - - - - - - - 60 to 68
Native Copper - - - - - - - - 60
Red Oxide - - - - - - - - 61
Black Oxide - - - - - - - 62
Chrysocolla - - - - - - - - 62
Malachite - - - - - - - - 62
Chessylite, or Blue Carbonate - - - - - - 63
Phosphates, Arseniates, &c. - - - - - - 64
Copper Glance and Purple Ore - - - - - - 65
Kupfer Schiefer - - - - - - - - 66
Copper Pyrites - - - - - - - 66
Fahlerz - - - - - - - - - 67

	Page
Iron	68
Magnetic Iron Ore	68
Titanium	69
Iron, continued	69 to 73
Hæmatite	69
Brown Iron Ore	70
Spathose Ore	72
Lievrite, Lölingite, and Mispickel	72
Iron Pyrites	73
Chrome Iron Ore	73
Manganese	73
Bismuth	74
Molybdenum, Uranium, &c.	74
Tin	75
Wolframium	75
Cobalt	75
Nickel	76
Antimony	76
Zinc	77
Lead	78
Silver	80 to 84
Native Silver	81
Sulphides	82
Chloride, &c	83
Gold	84
Platinum	85
Iridium, &c.	86
Tellurium	86
Mercury	86
Arsenic	87

ILLUSTRATIONS OF LODES, OR MINERAL VEINS.

Wall-cases 24 to 36.

Introduction	88 to 93
Illustrations of Lodes by the formation and filling of fissures in Clay-iron stones	93
Examples of Strings, or narrow Veins, composed chiefly of one Mineral	94 to 99
Examples of Lodes consisting chiefly of two Minerals	100
Examples of Lodes composed of several different Minerals	100 to 104
Examples of Lodes composed of various Minerals deposited in regular succession	104 to 107
Examples of the Attachment of newer deposited Minerals to certain Sides only of prior-formed Crystals	107
Specimens in evidence of successive Openings in Lodes: "Comby" Lodes	108
Examples of Breccia Lodes with Cement of non-metallic Mineral	109 to 111
Examples of Breccia Lodes with Cement of metallic Mineral	111 to 114
Examples of Breccias with Fragments of pre-existing Lodes	114
Examples of Stalactitic Lode Deposits	115

Page

Specimens in evidence of Sliding Motion in Lodes: "Slickensides" - - 116
Illustrations of Cellular Lodes: Incrustation and subsequent Disappearance of prior-formed Minerals - - - - - - 117 to 119
Illustrations of Anogenic Alterations in Lodes, or Changes originating in the upper Part - - - - - - - - 119 to 123
Pseudomorphs - - - - - - - - - 121
Gossans - - - - - - - - - 121
Examples of the Production of Native Metals by Alterations in Lodes - 123

COLONIAL PRODUCTIONS.

Wall-cases 37 to 42.

AUSTRALIA - - - - - - - - 124 to 127
NEW ZEALAND and TASMANIA - - - - - - 127
AUSTRALIA, continued (Pedestal Case, No. 11, West Side: Gold, &c.) 127 to 129
EAST INDIES - - - - - - - - 129 to 133
CANADA - - - - - - - - - 133
NOVA SCOTIA, NEW BRUNSWICK, &c. - - - - - 134
WEST INDIES - - - - - - - - - 135
BRITISH COLUMBIA - - - - - - - - 135
CANADA, continued - - - - - - - - 136
SOUTH AFRICA - - - - - - - 136 to 138

NON-METALLIC MINERALS.

Horse-shoe Case.

Case A.

CARBON - - - - - - - - 138 to 141
Diamond - - - - - - - - - 139
Graphite - - - - - - - - - 140

Case B.

CARBON AND HYDRO-CARBONS:
Anthracite and Coal - - - - - - - 141
Lignite, Jet, &c. - - - - - - - - 142
Mineral Resins - - - - - - - - 143
Amber - - - - - - - - 144

Case C.

SULPHUR - - - - - - - - 144 to 146
Native Sulphur - - - - - - - - 144
Sulphur-producing Minerals - - - - - - 145
Prepared Sulphur - - - - - - - 145
SELENIUM - - - - - - - - - 146

Page

Case D.

Salts of Sodium - - - - - - - - 146
Rock Salt - - - - - - - - 146
Cryolite, Thenardite, &c. - - - - - - 147
Boracic Acid - - - - - - - - 147
Salts of Potash - - - - - - - - 148

Case E.

Salts of Baryta - - - - - - - 148 to 150
Heavy Spar and Witherite - - - - - - 149
Alstonite and Baryto-calcite - - - - - - 150
Salts of Strontia - - - - - - - - 150
Celestine and Strontianite - - - - - - 150

Case F.

Salts of Lime - - - - - - - 150 to 152
Sulphate of Lime - - - - - - - - 150
Phosphate of Lime - - - - - - - 151

Case G.

Fluor Spar - - - - - - - - 152 to 154

Case H.

Calcite - - - - - - - - 154 to 156

Case I.

Carbonate of Lime, continued - - - - - 156 to 158
Marbles, &c. - - - - - - - - 156
Aragonite - - - - - - - - 157
Dolomite, Carbonate of Magnesia, &c. - - - - - 158

Case J.

Quartz - - - - - - - - 158 to 161
Rock Crystal - - - - - - - - 158
Cairngorm - - - - - - - - 159
Amethyst, Cats' Eye, Avanturine, &c. - - - - - 160

Case K.

Quartz, continued - - - - - - - 161 to 163
Chalcedony - - - - - - - - 161
Agate, &c. - - - - - - - - 162
Onyx, Jasper, &c. - - - - - - - 163
Illustrations of the Formation and Mode of Occurrence of Agates (Table-case, East Side) - - - - - - 163 to 169

Case L.

Silica, Amorphous and Hydrous - - - - - 169 to 171
Sandstone, Hornstone, Chert, &c. - - - - - 169
Flint, &c. - - - - - - - - 170
Opal, Hyalite, &c. - - - - - - - 170
Alumina - - - - - - - - - 171
Corundum, Emery, Ruby, Sapphire, &c. - - - - - 171

Page

Case M.

ANHYDROUS SILICATES - - - - - - 172 to 175
Beryl, Aquamarine, Emerald, &c. - - - - - 172
Chrysoberyl - - - - - - - - 173
Zircon, &c. - - - - - - - - 173
Tourmaline - - - - - - - - 173
Garnet - - - - - - - - - 174
Topaz - - - - - - - - - 175
Chrysolite, Spinel, &c. - - - - - - - 175

Case N.

ANHYDROUS SILICATES, continued - - - - - 176 to 180
Felspars - - - - - - - - - 176
Lapis Lazuli - - - - - - - - 177
Mica - - - - - - - - - 178
Jade, &c. - - - - - - - - 178
Augite - - - - - - - - - 179
Hornblende - - - - - - - - 180

Case O.

Asbestos - - - - - - - - - 180
HYDROUS SILICATES - - - - - - - 181 to 185
Meerschaum - - - - - - - - 181
Serpentine, &c. - - - - - - - - 181
Steatite, Chlorite, &c. - - - - - - - 182
Prehnite, Apophyllite, &c. - - - - - - 183

Case P.

Zeolites - - - - - - - - 183 to 185
SULPHATES AND PHOSPHATES OF ALUMINA - - - - - 185
Websterite, &c. - - - - - - - - 185
Wavellite, Turquois, &c. - - - - - - - 186

ADDENDA - - - - - - - - - 186

CATALOGUE

OF

THE MINERAL COLLECTIONS.

EXTENSIVE collections of minerals are generally formed and arranged for one of two purposes, either to represent as a branch of natural history the whole series of natural inorganic substances which possess a definite composition, and which collectively constitute the mineral kingdom; or to exhibit those minerals in particular which are capable of application to arts and manufactures. These diverse objects require no less a different selection of the specimens than a different grouping and ordering, to adapt them fully to the end in view.

The first or purely scientific treatment of the subject is carried out in the fine collections of the British Museum, where a philosophical arrangement of the various substances is adopted, based upon their natural affinities, without regard to the circumstances which render one or the other of them useful to man.

The second or more utilitarian principle has regulated the selection and the arrangement of the specimens in the Museum of Practical Geology. With this view, the substances from which the useful metals are obtainable, the "ores," are separated from those of an earthy, stony, or sparry character, which are not so available, but may be utilized for other purposes, or which are important to the geological student in the study of rocks.

Moreover, numerous specimens, which would not be admissible in a purely mineralogical cabinet, are extremely valuable in teaching the mode of occurrence of such substances in nature, and form a legitimate appendix to the foregoing in an institution especially devoted to the furtherance of practical geology.

The mineral specimens in the Museum have been selected principally as examples of the productions of certain localities, and in illustration of their applicability to useful purposes. They are placed in the series of wall-cases around the main floor, and in the horse-shoe case occupying a chief part of the central area.

With the view of adapting them specially to the convenience of those persons who desire to study the minerals with reference to their occurrence or applications, they are divided into five distinct series or suites, as follows :—

1st. The metallic minerals or ores of Great Britain (Cases 1—14, and 43—56).

2nd. The analogous ores of various foreign countries (Cases 15—23).

3rd. Mineral productions of British Colonies (Cases 37—42).

4th. Illustrations of the nature of mineral veins or lodes (Cases 24—36).

5th. A series of the more important * non-metallic minerals (Horse-shoe case).

Although Great Britain far exceeds any other country in the amount and value of its mineral productions, there was no comprehensive institution before the establishment of the Museum of Economic Geology, in which were placed the raw materials forming the basis of so many important branches of manufacture. All the chief productive localities are now represented, and the completeness of the collections is due not less to the liberality of private donors than to purchases made from time to time, and the opportunities afforded by the progress of the Geological Survey through the mining districts.

The whole of the floor of the principal room is devoted to the minerals, and to their application in the arts. In front of each of the bays containing the British ores is placed a table exhibiting samples to illustrate the metallurgical processes by which the ores placed opposite to them are treated for the extraction of their metals. Beyond these again, in the upright Cases, are examples of the metals as employed in the arts, either alone, or in alloys. Thus, in front of Cases 2, 3, 4, containing the ores of copper, will be found a table of specimens of the various products of the smelting furnaces ; and in the large Cases adjacent are ranged examples of castings in pure copper, and in its alloys with tin, zinc, &c., selected in each instance for some point of metallurgical interest. Similarly, the southern or Jermyn Street end of the room, is occupied by suites of specimens illustrating the arts of pottery and glass-making, from the raw materials and the earliest examples of the manufacture, to those which exhibit the condition of the trade at the present day. And it will be seen that, in like manner to the above, the various processes of these arts, whether in the selection of the materials, the colouring, glazing, or the firing, involve scientific principles which closely link them with the other and more obvious subjects of exhibition in the Museum.

ORES OF GREAT BRITAIN.

The metallic minerals of the British Islands occupy three bays or recesses in each side of the principal floor, and are grouped according to the metal which in each substance is the principal object of research. The specimens are of two kinds, viz., those which represent the characteristic occurrence of the commercially useful ores in particular districts or mines, and those which exhibit in a remarkable degree the physical characters of form and color so useful in the identification of mineral species. To these are added, in subordinate number, examples of those kinds which, although containing a large per-centage of a particular metal, have, either from their rarity, or from their combination with other substances, not hitherto found an application in the arts.

Ores of Copper.

The principal copper-producing districts are Cornwall, Devonshire (West of Dartmoor), Cumberland, Anglesey, and the counties of

* The terms *metallic* and *non-metallic* are here used as they are understood in ordinary language ; thus, the minerals containing alumina are classed under the latter head, although that earth contains as its base the light metal aluminium.

Waterford, Wicklow, and Cork, in Ireland; and an estimate of the importance of the copper mines of the country may be formed from the following table, showing at a glance the quantities actually sold in the year 1863 :—*

District.	No. of Mines.	Copper Ore.	Copper produced.	Value of Copper.
		Tons.	Tons.	£
Cornwall and Devon - } public sales	190	169,971	10 6	1,077,119
Northern Counties - } public sales	9	4,377	485	47,942
Wales - - } public sales	12	10,110	654	64,647
Ireland - - } public sales	8	16,489	1,562	154,900
Private sales, including a few English mines, &c.	20	10,000	650	65,000
Total for the year 1863 -	239	210,947	14,247	1,409,608

Upwards of 35,000 persons are regularly employed in these mines.

The copper ores of Britain are found almost exclusively in lodes, or regular veins which traverse granite and slaty rocks (killas) of the Devonian, and in some cases of the Silurian period; the only instances of their occurrence on a large scale in limestone are at Llandudno in North Wales and Ecton in North Staffordshire. They are commonly associated with iron pyrites, quartz, fluor-spar, and chlorite; more rarely with tin ore, zinc-blende, galena, and calc-spar. The ore is seldom obtained in remunerative quantity near the surface, and in some cases is extracted from the depth of about 300 fathoms, or 1,800 feet.

WESTERN SIDE.

Wall Cases 1 to 14.

Wall Case 1.

Shelf I.

1. Native Copper, associated with quartz.
From the Great St. George Mine, Perran Porth, Cornwall.
Presented by H. Humphries.

2. Native Copper.
From Pembroke Mine, St. Austell, Cornwall.
Presented by R. Taylor, F.G.S.

3. Native Copper, intermingled with quartz.
Devon and Courtnay Mines, near Tavistock, Devon.
Presented by William Randle.

3a. Native Copper, in trap-rock.
From Arran-more, Co. Donegal, Ireland.

4, 5, & 6. Native Copper, in strings and sheets in trap-rock.
From the neighbourhood of Glasgow.
Presented by Mr. Graham.

Shelf II.

7. String of Native Copper and Red-oxide of Copper.
St. Austell, Cornwall.

8 & 9. Native Copper, dendriform.
From the Lizard District, Cornwall.

* *See* the Mineral Statistics compiled by Mr. Robert Hunt, Memoirs of the Geological Survey, 1863.

10. Native Copper, crystallized.
Cornwall.

11. Native Copper, crystallized.
Carn Brea, near Redruth, Cornwall.

12. Native Copper, crystallized, with red-oxide of copper.
**Huel Buller, Cornwall.*
Presented by R. Taylor, F.G.S.

13. Native Copper, massive, incrusted with red-oxide and green carbonate of copper.
From a vein in Serpentine at Mullion, Lizard District, Cornwall.
Presented by the late G. B. Greenough, F.R.S., G.S.

14. Native and Red-oxide of Copper, in Serpentine.
From the Lizard District, Cornwall.
Presented by J. Plomer.

15 & 16. Native and Red-oxide.
Carn Brea Mines, near Redruth, Cornwall.
Presented by the late J. Garby.

Shelf III.

17. Native Copper, in strings and sheets.
Polberro Consols, Cornwall.

18. Native Copper, dendritic.
Pembroke Mine, St. Austell, Cornwall.

19. Native Copper, crystalline, dendritic.
Cornwall.

20 to 22. Native Copper, in thin sheets.
Pembroke Mine, near St. Austell, Cornwall.
Presented by Captains Barratt and Paul.

23. Native Copper, foliated.
Carn Brea Mines, near Redruth, Cornwall.
Presented by the late John Garby.

24, 25, & 26. Native Copper, dendritic.
Cornwall.
Presented by the late Sir Henry De la Beche, C.B., Director of the Museum.

27. Native Copper, intermingled with quartz.
St. George Mine, Perran Porth, Cornwall.
Presented by H. Humphries.

28. Native and Red-oxide of Copper.
Huel Buller, Cornwall.
Presented by Richard Taylor, F.G.S.

29. Native Copper, crystallized.
Cornwall.

30. Native Copper, crystallized on quartz.
Treskerby Mine, Cornwall.
Presented by G. Croker Fox.

31. Native Copper, reticulated.
Treskerby Mine, Cornwall.

32. Native Copper, massive.
Cornwall.

33. Native Copper.
From the Serpentine, Lizard, Cornwall.

34. Native Copper, well crystallized.
Relistian Mine, Cornwall.
Presented by William Randle.

35. Native Copper, crystallized.
Cornwall.
Presented by the late G. B. Greenough, F.R.S.

36 & 37. Native Copper, crystallized, reticulated, and associated with quartz.
Lanescot Mines (Fowey Consols).
Presented by P. N. Johnson, F.R.S.

38. Native Copper, delicately reticulated.
Treskerby Mine, Cornwall.
Presented by G. C. Fox.

39. Native Copper, delicately reticulated.
Huel Fanny, Carn Brea, Cornwall.

---

* The prefix *Huel*, often corrupted into Wheal, signifies in the old Cornish language a mine or work ; *Consols*, a group of consolidated mines.

Oxide of Copper.

Red Oxide (cuprite, ruby or red copper ore), one of the richest ores of copper, rarely occurring in large quantities, and generally at no great depth.

Composition of the pure mineral (sub-oxide): copper, 88·79; oxygen, 11·21.

Shelf IV.

40. Red-oxide of Copper, crystallized, with native copper.
Treskerby Mine, Cornwall.
Presented by G. C. Fox.

41 & 42. Red-oxide, massive.
Knockmahon Mine, County Waterford, Ireland.
Presented by J. Petherick, F.G.S.

43. Red-oxide, compact and crystallized, capillary.
Knockmahon Mines, County Waterford, Ireland.

44. Cuprite (Red oxide of Copper), fine specimen, faces of crystals very brilliant.
Phœnix Mine, Liskeard, Cornwall.
Presented by Mr. Jas. Seccombe.

45. Cuprite, magnificent group of octohedral crystals, iridescent.
Huel Gorland, Cornwall.
Presented by G. C. Fox.

Shelf V.

46. Cuprite, with native copper.
Cornwall.
Presented by the late R. Phillips, F.R.S.

46a. Cuprite, fine octohedral crystals, with native copper.
South Huel Frances, Cornwall.

47. Cuprite, crystallized and massive.
Carn Brea Mines, Cornwall.
Presented by the late J. Garby.

48. A card supporting four detached crystals of Red-oxide of Copper.
No. 1.—The cube.
From Cornwall.
No. 2.—The octohedron, coated with Malachite;
No. 3.—The octohedron, having the edges replaced by six-sided planes, which when increased form the rhombic dodecahedron No. 4;
Nos. 2, 3, and 4 are from Chessy in France.
Presented by the late G. B. Greenough, F.R.S., G.S.

49 & 50. Cuprite, fine mass of octohedral crystals.
Carn Brea Mine, Illogan, Cornwall.
Presented by the Adventurers of the Mine.

51 & 52. Red-oxide and Native Copper, crystallized.
Redruth, Cornwall.
Presented by G. B. Greenough, F.R.S.

53. Cuprite, with condurrite (arsenical copper).
Cornwall.

54. Cuprite (Tile ore) compact.
Huel Unity, Cornwall.
Presented by G. B. Greenough, F.R.S.

55. Red-oxide, massive, compact, with green carbonate of copper.
Dolcoath Mine, Camborne, Cornwall.
Presented by Captain W. Petherick.

56. Red and Black-oxides of Copper, massive.
Dolcoath Mine, Camborne, Cornwall.
Presented by Captain W. Petherick.

Shelf VI.

Black Oxide (Melaconite, Kupferschwärze), a substance yielding a variable quantity of oxide of copper, mingled with the oxides of manganese and iron, and containing a large per-centage of water.

57. Black Oxide of Copper.
Huel Jewel, Gwennap, Cornwall.
Presented by the late Jno. Williams.

58. Black Oxide and sulphide of copper.
Marazion Mines, Cornwall.

59. Black Oxide, with crystallized copper and iron pyrites.
Huel Trenwith, St. Ives, Cornwall.

60. Black Oxide, and sulphide of copper.
Pembroke Mine, St. Austell, Cornwall.
Presented by R. Taylor, F.G.S.

61. Black Oxide (Melaconite).
Cornwall.

62. Black Oxide.
Cronebane Mine, County Wicklow, Ireland.

Shelf VII.

63. Large specimen of Red Oxide associated with blue and green carbonates of copper.
From the 120 fathoms level, Phœnix Mines, near Liskeard, Cornwall.
Presented by W. W. Smyth, F.R.S.

64 & 65. Large specimens of Red Oxide, massive, compact.
Phœnix Mine, near Liskeard, Cornwall. 1851.

66 & 67. Black Oxide (Melaconite).
Cornwall.

Wall Case 2.

Carbonates and Silicates of Copper.

Malachite, or *Green Carbonate*, contains protoxide of copper, 71·91; carbonic acid, 19·93; water, 8·16.*

Azurite, (Blue Malachite,) or *Blue Carbonate*, contains protoxide of copper, 69·19; carbonic acid, 25·58; water, 5·23.

Chrysocolla, or *Silicate of Copper*, contains oxide of copper, 45·2; silica, 34·3; water, 20·5.

These minerals, of which the first is used as an ornamental substance as well as for the extraction of copper, occur in Britain only in subordinate quantities, and generally near the surface.

Shelf I.

68 & 69. Cupriferous Sandstone, from the New Red Sandstone formation (containing about 12 per cent. of copper).
Alderley Edge, Cheshire.
Presented by Mr. Mitchell.

70. Cupriferous Sandstone from the "wall" of a vein in the New Red Sandstone.
Rednall, Shropshire.

71 & 72. Cupriferous Sandstone (green carbonate).
Erdiston, near Felton, Shropshire.
Presented by F. Bankart.
Several pits have been sunk along the course of the lode (N.E. & S.W.) for the distance of a quarter of a mile. Breadth of lode, 14 inches to 3 feet. Dip, 45° to the N.W.

72a & b. Cupriferous Sandstone (blue and green carbonates).
Hawkestone, Shropshire.
Presented by Lord Viscount Hill.

73. Cupriferous Sandstone (green carbonate).
From the "Bunter Sandstein" of Alderley Edge, Cheshire.
Presented by G. W. Ormerod, F.G.S.

Shelf II.

74 to 77. Green Carbonate of Copper, cementing grains of sand and recent shells; formed within the last 15 years by the action of the rain-water percolating through the waste heaps of an old mine.
Raised as an "ore" at Huel Leisure, Perranzabuloe, Cornwall. 1855–62.
Presented by W. W. Smyth, F.R.S.

78 & 79. Blue and Green Carbonates of Copper, with Copper Pyrites.
Mallaen Mountain, Cil-cwm, Caermarthenshire.
Presented by Captain Harris.

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* It should be understood that the analysis here given represents the constitution of the mineral in the highest state of purity, and that the analysis of ordinary specimens would include varying amounts of substances accidentally mingled with them.

80 & 81. MALACHITE, with Copper Pyrites.
Cosheen Mine, County Cork, Ireland.
Presented by J. D. Croker.

82. MALACHITE, green.
Cosheen Mine, near Skull, County Cork, Ireland.
Presented by William Connell.

83. COPPER ORE, having the form of a geode and containing carbonate of copper, chrysocolla (silicate of copper), &c.
Presented by the Geological Society of London.

Shelf III.

84 & 85. MALACHITE, green, crystallized and fibrous stellated.
Cumberland.

86. GREEN CARBONATE OF COPPER.
From the Cambrian Slates of Rattlinghope, Shropshire.

87. MALACHITE, light green.
Geufron Mine, Llanidloes, Montgomeryshire.

88. MALACHITE (Blue and Green).
Near Old Radnor, Wales.

89. MALACHITE (Blue and Green). The blue is crystallized, but the green botryoidal.
Nether Stowey, Somersetshire.
Presented by G. C. Fox.

90. MALACHITE, blue and green.
Nether Stowey, Somersetshire.
Presented by G. B. Greenough, F.R.S.

91. MALACHITE, dark green, fibrous radiating.
Tipperary, Ireland.
Presented by G. B. Greenough, F.R.S.

91a. MALACHITE, dark green, acicularly crystallized.
Redruth, Cornwall.
Presented by G. B. Greenough, F.R.S.

92 to 94. MALACHITE, massive, botryoidal, and reniform, with various shades of green.
Gunnislake Mine, near Calstock, Cornwall.
Presented by Sir Henry T. De la Beche.

95. MALACHITE (dark green), fibrous radiating, and CHRYSOCOLLA (light blue), mammillated.
Gunnislake Mine, Calstock, Cornwall.
Presented by G. C. Fox.

96. MALACHITE, pale green, with red-oxide of copper.
Redruth, Cornwall.
Presented by G. B. Greenough, F.R.S.

97. MALACHITE, blue and green.
Huel Trefusis, near Redruth, Cornwall.
Presented by the late J. Garby.

98. CHRYSOCOLLA, botryoidal.
Keswick, Cumberland. 1860.

99. CHRYSOCOLLA (light blue), mammillated; and PITCHY COPPER ORE (brown resinous).

100. CHRYSOCOLLA, massive, with red-oxide of copper.
Knockmahon Mines, Waterford.

Shelf IV.

ARSENIATES AND PHOSPHATES OF COPPER.

OLIVENITE; COPPER MICA (*Tamarite*); CLINOCLASE; LIROCONITE (*lenticular arseniate*); CONDURRITE (*massive arsenide*); LIBETHENITE (*phosphate of copper*).

This group of minerals, containing oxide of copper, combined with arsenic and phosphoric acids and water, is not employed for the production of copper.

101. OLIVENITE (*right prismatic arseniate of copper*), massive, with copper glance.
From the Tin Lodes, in the deepest part of Beam Mine, St. Austell, Cornwall. 1853.

102. CLINOCLASE (*oblique prismatic arseniate of copper*), dark green, crystallized upon LIROCONITE (*lenticular arseniate of copper*).
Huel Providence, Cornwall.

103. LIROCONITE (*lenticular arseniate of copper*), crystallized.
Cornwall.

The following series (Nos. 104 to 128) principally from the neighbourhood of Redruth, Cornwall, were presented by the late G. B. Greenough, F.R.S. :—

104 & 105. Liroconite (*lenticular arseniate*), crystallized.

106 & 107. Copper Mica (*hexagonal arseniate*).

108 & 109. Clinoclase, crystallized in spheroidal groups.

110. Liroconite upon Olivenite.

111. Olivenite (*hæmatitic*).

112 to 114. Olivenite, crystallized in capillary tufts.

115 to 117. Olivenite, acicularly crystallized.

Shelf V.

118 to 120. Olivenite (wood arseniate), fibrous.

121 to 125. Olivenite, crystallized.

126 & 127. Olivenite (amianthiform).

128. Olivenite, minutely crystallized.

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129. Olivenite occurring between two veins of quartz.
Redruth, Cornwall. 1860.

130. Minute lenticular crystals of Liroconite upon mammillated Libethenite (*phosphate of copper*).
Gunnislake Mine, Calstock, Cornwall.

130a. Libethenite, crystallized and cellular.
South Huel Frances, near Redruth, Cornwall. 1860.

131 to 135. Condurrite (*impure arsenide of copper*), massive nodular.
From Condurrow and Carn Brea Mines, Cornwall.*
Presented by the late J. Garby.

Shelf VI.

Copper-Glance, vitreous-copper ; Redruthite, (*disulphide of copper*). Copper, 79·84 ; sulphur, 20·16.

135a. Copper-Glance.
Disseminated through a Quartz Breccia, at Rattlinghope, near Bishops Castle, Shropshire.

136. Copper-Glance, crystallized.
Huel Fortune, Marazion, Cornwall.
Presented with many of the following by the late Sir H. De la Beche.

137 to 139. Copper-Glance, crystallized.
Levant Mine, St. Just, Cornwall.

140. Copper-Glance, well crystallized.
Levant Mine, near St. Just, Cornwall.

141 & 142. Copper-Glance, well crystallized, on quartz.
West Cornwall.

143. Copper-Glance, crystallized.
Botallack Mine, St. Just, Cornwall.

144. Copper-Glance, crystallized.
Trevetha Mine, Cornwall.

145 & 146. Copper-Glance, crystallized.
Carn Brea, Cornwall.

147. Copper-Glance, crystallized, and intermingled with purple copper ore, well crystallized.
Carn Brea, Cornwall.

148. Copper-Glance, crystallized.
Cornwall.

149. Copper-Glance, (Redruthite.)
East Huel Basset, Cornwall.

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* The mine whence it derives its name.

150 & 151. COPPER-GLANCE, crystalline, and exhibiting cubical cleavage.
Great St. George Mine, Perranzabuloe, Cornwall.

152. COPPER-GLANCE, massive.
Huel Trenwith, St. Ives, Cornwall.

153. COPPER-GLANCE, massive, from a vein in serpentine.
Huel Downas, St. Keverne, Lizard District, Cornwall.

154. COPPER-GLANCE, massive.
South Basset, near Redruth.
Presented by the late J. Garby.

155. COPPER-GLANCE.
Trethellan Mine, Gwennap, Cornwall.
Presented by the late J. Garby.

156. COPPER-GLANCE, massive,
Dolcoath Mine, near Camborne, Cornwall.
Presented by W. Petherick.

Shelf VII.

157. COPPER-GLANCE, massive.
Levant Mine, St. Just, Cornwall.
Presented by Sir H. T. De la Beche.

158 & 159. COPPER-GLANCE, massive, with black-oxide.
Great St. George Mine, Perranzabuloe, Cornwall.
Presented by H. Humphries.

160. COPPER-GLANCE, with red oxide.
South Caradon Mine, St. Cleer, Cornwall.

161. COPPER-GLANCE, massive.
Huel Jewel, Gwennap, Cornwall.
Presented by John Williams.

162. COPPER-GLANCE, massive.
Marazion Mines, Cornwall.

163. COPPER-GLANCE, massive.
Pembroke Mine, St. Austell, Cornwall.
Presented by R. Taylor, F.G.S.

164. COPPER-GLANCE, massive.
Knockmahon Mines, County Waterford, Ireland,
From the Exhibition of 1851.

165. COPPER-GLANCE, mass of, found imbedded in slate,
Some distance from the Lode at Busworgie Mine, St. Erth, Cornwall.
Presented by Captain Trebilcock.

166. Part of a lode of COPPER-GLANCE.
West Cornwall.

Shelf VIII.

167. Part of a copper lode, containing COPPER-GLANCE, and other ores of copper.
South Basset, Illogan, Cornwall.

168. COPPER-GLANCE, associated with quartz.
From a Copper Lode, Cornwall.

169. Mass of COPPER-GLANCE,
Tresavean Mine, Gwennap, Cornwall.
Presented by T. Teague.

170. Part of a copper lode, containing COPPER-GLANCE, associated with quartz, and strings of native copper.
West Caradon, Liskeard, Cornwall.

WALL CASE 3.

COPPER PYRITES, Chalcopyrite, Towanite, or yellow ore (*Sulphide of copper and iron*). Copper, 34·55; iron, 30·54; sulphur, 34·91.

Of this, the most important British ore of copper, a series of specimens is arranged topographically in the following order:—*
Western mines of Cornwall.
Eastern district of Cornwall.
Devonshire.
Other English localities.
Wales, South, North, and Anglesey.
Ireland.

Shelf I.

171. COPPER PYRITES with Tin ore.
Huel Fortune, Marazion, Cornwall.

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* A few only of the larger specimens placed at the bottom of the cases could not be ranged precisely in the same order. The crystallized specimens are also grouped together independently of their various places of occurrence.

172 & 173. Copper Pyrites, with Tin ore.
Marazion Mines, near Penzance, Cornwall.

174. Copper Pyrites, with Zinc Blende.
From Huel Vor Tin Mine, Breague, Cornwall.
Presented by J. Sylvester.

175. Copper Pyrites, with Tin ore.
From Great Work, Breague.
Presented by J. Sylvester.

176. Branch of Copper Pyrites, the "walls" or sides being removed.
Huel Tolgus, Redruth, Cornwall.
Presented by J. Mitchell.

177. Part of a Copper Lode: exemplifies a common mixture of quartz and copper pyrites in Cornish copper lodes; on one side the quartz is crystallized towards a "vug" or cavity.
Huel Tolgus, Redruth, Cornwall.
Presented by J. Mitchell.

178. Copper Pyrites.
Huel Tolgus, Redruth.
Presented J. Mitchell.

Shelf II.

179 & 180. Copper Pyrites, massive and mammillated.
Huel Jewel, Gwennap, Cornwall.

181. Copper Pyrites.
Great Work, Breague, Cornwall.

182. Copper Pyrites, with Iron Pyrites.
Consols Mines, Gwennap, Cornwall.

183 & 184. Strings of Copper Pyrites, and Fluor-spar, in granite.
Tresavean Mine, near Redruth, Cornwall.
Presented by T. Teague.

185 & 186. Copper Pyrites, associated with Copper Glance.
Pembroke Mine, St. Austell, Cornwall.
Presented by R. Taylor, F.G.S.

Shelf III.

187. Copper Pyrites, with black Oxide.
Great Work, Breague, Cornwall.
Presented by J. Sylvester.

188. Part of a Copper Lode.
Great St. George Mine, Perranzabuloe, Cornwall.
Presented by H. Humphries.

189. Copper Pyrites, crystallized and massive.
Huel Jewel, Gwennap, Cornwall.

190. Copper Pyrites, with Iron Pyrites and Quartz, from a poor lode.
Consols Mine, Gwennap, Cornwall.

191. Copper Pyrites, externally tarnished.
Dolcoath Mine, Redruth, Cornwall.
Presented by Captain W. Petherick.

192. Copper Pyrites, amid the laminæ of altered Slate.
Dolcoath Mine, Cornwall.

193. Copper Pyrites, with Silver Ore.
Dolcoath Mine, Cornwall.
Presented by Captain W. Petherick.

194. Copper Pyrites, massive, good sample.
Dolcoath Mine.
Presented by Captain W. Petherick.

195. Copper Pyrites, with Galena.
Kellewarris Mine, Chasewater, Cornwall.

196. Copper Pyrites, externally tarnished.*
Copper Bottom Mine, Cornwall.

197. Copper Pyrites, with imbedded crystals of Iron Pyrites.
Copper Bottom Mine, Cornwall.

198. Copper Pyrites.
Cook's Kitchen Mine, Illogan, Cornwall.
Presented by the late J. Garby.

Shelf IV.

199. Copper Pyrites, externally tarnished.
Cornwall.

* Copper Pyrites, when tarnished or coated with a thin film of iridescent colour, is termed *peacock ore.*

200. Copper Pyrites, crystals with specular Iron (Peroxide), Spathose Iron (Carbonate), and Fluor Spar.
Carn Brea Mines, Illogan, Cornwall.
Presented by the late J. Garby.

201. Copper Pyrites, crystallized on quartz.
Carn Brea Mine, Illogan.

202. Copper Pyrites, iridescent crystals.
Camborne, Cornwall.

203. Copper Pyrites, crystallized in sphenoids upon Spathose Iron, investing quartz.
Camborne, Cornwall.

204. Copper Pyrites, in square pyramidal crystals.
Herodsfoot Mine, near Liskeard, Cornwall.

205 & 206. (Specimens to be added.)

207. Copper Pyrites, crystals, externally tarnished.
North Roskear, Camborne, Cornwall.

Shelf V.

208. Copper Pyrites, crystallized.
East Huel Crofty, Illogan, Cornwall.

209 & 210. Copper Pyrites, crystallized in sphenoids on rock crystal.
St. Austell, Cornwall.

211. Copper Pyrites, sphenoidal, and iron pyrites cubical, with quartz crystals.
Crinnis Mine, St. Austell, Cornwall

212. Copper Pyrites, tetrahedral or sphenoidal crystals upon rock-crystal.
St. Austell, Cornwall.

213. Copper Pyrites, crystals scattered over Pearl-Spar.
Cornwall.
Presented by Sir W. E. Logan.

214. Copper Pyrites, crystalized in the cracks of an iron-stone nodule.
From the Clay Balls Ironstone, Dudley.

Shelf VI.

215. Copper Pyrites, crystallized.
Huel Friendship, near Tavistock, Devonshire.

216. Copper Pyrites, botryoidal, ("run" or "blister ore" of the miners.)
Great Work, Breague, Cornwall.
Presented by J. Sylvester.

217. Copper Pyrites, botryoidal.
Dolcoath Mine, near Camborne, Cornwall.
Presented by Captain W. Petherick.

218. Copper Pyrites.
Dolcoath Mine, Cornwall.
Presented by the Hon. Lady Bassett.

219. Copper Pyrites, botryoidal.
Carn Brea Mines, Illogan, Cornwall.

220. Copper Pyrites, mammillated.
Binner Downs, Cornwall.

221 & 222. Copper Pyrites mammillated.
Tresavean Mine, Gwennap, Cornwall.
Presented by J. Enys.

223. Copper Pyrites, botryoidal.
East Pool Mine, near Pool, Cornwall.
Presented by A. Broad.

224. Copper Pyrites, botryoidal and mammillated.
St. Ives, Cornwall.
Presented by J. Lavin.

225. Copper Pyrites, botryoidal, externally tarnished.
Huel Crenver, Cornwall.
Presented by J. C. Fox.

Shelf VII.

226 & 227. Copper Pyrites, with Fluor-spar.
From a lode in Granite, 64 fathoms level, Huel Buller, near Redruth, Cornwall. 1851.

228. Part of a Copper Lode, containing Yellow Ore, Blende and Quartz.
Illogan, Cornwall.

229. Large mass of COPPER PYRITES.
From a lode in Granite, 110 fathoms level, South Frances, Illogan, Cornwall. 1851.

Shelf VIII.

230. Mass of COPPER PYRITES.
From a lode at Consols Mines, Gwennap, Cornwall.
Presented by the Adventurers of the Mine.

231. Mass of COPPER PYRITES, externally tarnished.
Huel Buller, Redruth, Cornwall.

232. Part of a Copper Lode, consisting chiefly of the mammillated COPPER PYRITES; the lode is full of cavities, or "vuggy," (as the Cornish miners term it). It formed part of a lode chiefly worked for tin.
Great Work Mine, Breague, Cornwall.
Presented by J. Sylvester.

233. Large mass of COPPER PYRITES.
From a Copper lode at United Mines.

WALL CASE 4.

Shelf I.

234 & 235. COPPER PYRITES, associated with Chlorite.
Par Consols, St. Blazey, Cornwall.

236. COPPER PYRITES, intermingled with Iron Pyrites.
From the 122 fathoms level of Job's lode, in dark grey, smooth killas, East Crinnis, near St. Austell, Cornwall. 1855.

237. COPPER PYRITES.
Fowey Consols, St. Blazey, Cornwall.
Presented by the late J. Austen Treffry.

238. COPPER PYRITES, massive.
From 280 fathoms level, Trathan's lode, Fowey Consols, St. Blazey, Cornwall. 1857.

239. COPPER PYRITES, disseminated in granite, near a copper lode.
Fowey Consols, St. Blazey.
Presented by the late J. Austen Treffry.

240. COPPER PYRITES, (pale yellow ore).
From the 40 fathoms level, the Duke of Cornwall Mine, Lostwithiel. 1855.

Shelf II.

241. COPPER PYRITES, massive, iridescent.
From the 132 fathoms level, Holmbush Mine, near Callington, Cornwall. 1852.
Presented by Captain Lean.

242. COPPER PYRITES, with Black-oxide.
From the 55 fathoms level, Hingston Down Consols, Cornwall. 1855.

243 & 244. COPPER PYRITES, massive, with an iridescent tarnish.
Hingston Down Consols, Cornwall.

245. COPPER PYRITES and Iron pyrites.
From the 50 fathoms level, Huel Zion, Cornwall. 1855.
Presented by W. W. Smyth, F.R.S.

Shelf III.

246 & 247. Clay-slate, "killas" (of the Cornish miners).
From the north "wall" of the lode, Huel Zion, Cornwall.

248. COPPER PYRITES (iridescent) around a pseudomorphous cavity.
Redruth, Cornwall.

249. COPPER PYRITES, crystallized in pyramids.
Herodsfoot Mine, Cornwall.

250. COPPER PYRITES, massive, average sample.
From 35 fathoms level, Huel Arthur, Cornwall.
Presented by W. W. Smyth, F.R.S.

251. Mammillated COPPER PYRITES.
From Clitters Adit, Gunnislake.
Presented by the Tavistock Committee. 1862.

251a. COPPER PYRITES in quartz, with iridescent tarnish.
Cornwall.

Shelf IV.

252 & 253. COPPER PYRITES, massive, iridescent, with imbedded crystals of Iron pyrites.
Virtuous Lady Mine, Tavistock.

254. Copper Pyrites, massive.
Devon and Courtenay Mine, near Tavistock, Devonshire.
Presented by W. Rendle.

255. Copper Pyrites, massive, enclosing fragments of killas.
Huel Friendship, Tavistock, Devonshire.

255a. & 255b. Copper Pyrites, in slate near the junction with the Granite, and close to the dyke which divides the granite from the slate.
Benjamin's chair, South end of Lundy Island.
Presented by W. H. Heaven.

256. Copper Pyrites, with Galena and Blende imbedded in Clay-slate.

Shelf V.

257. Copper Pyrites, tetrahedral, crystallized with blende in a cavity in Limestone.
Lord Ferrers' Mine, near Ashby de la Zouch, Leicestershire.
Presented by G. B. Greenough, F.R.S.

258. Copper Pyrites, tetrahedral crystals, with blende and calc-spar, in the Mountain Limestone.
Staunton Harold, near Ashby de la Zouch, Leicestershire.

259. Copper Pyrites, in the Upper New Red Sandstone.
Alderley Edge, Cheshire.
Presented by G. Ormerod, F.G.S.

260 to 262. Copper Pyrites, with iridescent tarnish.
Coniston Mine, Cumberland.

263. Copper Pyrites, with Malachite, &c.
Near Gatehouse, County Kirkcudbright, Scotland.
Presented by A. Murray, F.G.S.

Shelf VI.

264. Copper Pyrites, with iridescent tarnish, 15 fathoms deep.
From Eaglebrook Mine, Cardiganshire.
Presented by W. Spooner.

265 to 268. Copper Pyrites, with galena, from the "back" or outcrop of the lode (the shallow workings of the mines).
At Cwm Symlog, Cwm Sebon, and Penrhiw Lead Mines, near Aberystwith, Cardiganshire.

269. CopperPyrites, associated with galena, blende, and calcite.
Lisburne Mine, Cardiganshire.

270. Copper Pyrites, iridescent, from the lead lode,
At Nant-y-Creiau Mine, Cardiganshire.
Presented by J. Jones.

271 to 273. Copper Pyrites, massive, with barytes and siderite (Carbonate of iron).
Nant-y-Car Copper Mine, near Rhayader, Radnorshire, North Wales.

Shelf VII.

274 to 278. Strings of Copper Pyrites and Galena, in Clay-slate.
From Geufron and Tyn-y-pont, near Llanidloes, Montgomeryshire, North Wales.

279. Large mass of Copper Pyrites, compact.

Shelf VIII.

280. Large mass of Copper Pyrites.
From Devon Great Consols, Tavistock, Devonshire.

281 & 282. Copper Pyrites, crystallized and massive, "vuggy" portion of the lode.
Tywarnhaile Mines, St. Agnes, Cornwall.
From the Exhibition of 1851.

282a. Copper Pyrites, rich class of ore.
Clitters Adit, Gunnislake.
Presented by the Tavistock Committee. 1862.

283. Copper Pyrites.
Par Consols, St. Blazey, Cornwall.

Wall Case 5.

Shelf I.

284. Copper Pyrites.
Glasdir, near Dolgelly, Merionethshire, North Wales. 1857.

285. Part of a Copper Lode, containing copper pyrites, blue carbonate, &c., with quartz.
Vigra Mine, near Dolgelly, North Wales.
Presented by the late J. Harvey.

286. Copper Pyrites.
Maes-mawr (Crown Set), near Dolgelly, Merionethshire, North Wales. 1857.

Shelf II.

287 to 290. Copper Pyrites, associated in some instances with magnetic iron.
From the Snowdonian Mines, Beddgelert, Cwm Llan, Cwm Meirch and Drws-y-Coed, North Wales.

291. Copper Pyrites and Galena.
Llandudno Copper Mines, Great Ormes Head, North Wales.

291a & 291b. Copper Pyrites, crystallized on quartz.
Great Ormes Head Copper Mines, North Wales.

Shelf III.

292. Copper Pyrites, with opaque white quartz.
Pont-y-Gaseg Mine, near Amlwch, Anglesey.
Presented by J. Morgan.

293. Copper Pyrites.
Carmel's Point, Anglesey, North Wales.

294, 295, & 299. Copper Pyrites.
Pary's Mine, North Lode, Anglesey.

296 to 298. Copper Pyrites.
Carreg-y-doll Lode, and Glan-y-felin Lode, Mona Mine, Anglesey.

Shelf IV.

300. Copper Pyrites, large specimen of this ore, with quartz and calcite, from a lode in Clay-slate.
From Vigra Mine, between Barmouth and Dolgelly, North Wales.
Presented by James Harvey.

301. Copper Pyrites, associated with chlorite.
Par Consols, St. Blazey, Cornwall.
From the Exhibition of 1851.

302. Copper Pyrites, a large compact mass.
Gryll's Mine, Redruth, Cornwall.

Wall Case 6.

Shelves I. & II.

303 to 307. Copper Pyrites.
From Dhurode, near the Mizen Head, and from the Berehaven or Allihies Mines, on the West Coast of Cork, the most successful which have yet been opened in Ireland.

308 & 309. Copper Pyrites, with purple and vitreous ore.
Ardtully Mine, Kenmare, County Kerry, Ireland.

310. Strings of CopperPyrites and iron pyrites.
Connoree Mine, County Wicklow, Ireland.

311 & 312. Copper Pyrites associated with magnetic iron ore.
Ballycoog, County Wicklow, Ireland.

313 & 314. Copper Pyrites and quartz.
Ballymurtagh Copper Mine, Vale of Avoca, County Wicklow.

315. Copper Pyrites, with iridescent tarnish.
Knockmahon Mine, County Waterford, Ireland.

316. Matrix of the Copper Lodes, west of Dane's Island, containing quartz, epidote, calcite, and fragments of the adjacent rock, a serpentinous greenstone.
Knockmahon Mines, County Waterford, Ireland.

N.B.—This series of ores is continued in Wall Case 7.

Wall Case 7.

Copper.

Bornite, Buntkupfererz, Purple ore, or Variegated Copper, ("Horse-flesh ore" of the Cornish miners), consists of *Sulphide of Copper*, with a variable proportion of *Sulphide of Iron*, or iron py-

rites ; and contains about, copper, 55·57; iron, 16·37; sulphur, 28·06.

Some of the finest specimens of this ore are from the mines of Western Ireland ; although it occurs abundantly in several foreign countries, it is only found crystallized in the central district of Cornwall.

Shelf I.

317 to 321. BORNITE, incrusted with Green Malachite.

Cosheen Mines, near Skull, County Cork, Ireland.

Presented by J. D. Croker, and Wm. Connel.

Shelf II.

322. BORNITE, with copper glance, massive, from a lode between Clay-slate and Limestone rock.

Ardtully Mine, Kenmare, County Kerry, Ireland.

Presented by J. D. Croker.

323. BORNITE, iridescent, in quartz.

Kenmare, County Kerry.

324. BORNITE, and copper pyrites, massive.

Kenmare Mines, County Kerry.

Presented by Captain Ewbank.

325, 326, 327. BORNITE, iridescent.

Kenmare Mines, County Kerry.

Presented by Thomas Cornish.

Shelf III.

328. BORNITE, with copper pyrites, and grey copper ore.

Ardtully Mines, County Kerry, Ireland.

Presented by T. Cornish.

329. BORNITE, with variegated tarnish.

Knockmahon Mines, County Waterford, Ireland.

330. BORNITE, and copper glance.

Knockmahon Mines, County Waterford, Ireland.

331, 332, 333. BORNITE, and copper pyrites, massive.

Dolcoath Mine, Camborne, Cornwall.

Presented by Captain Petherick.

334. BORNITE, massive.

Carn Brea Mine, Illogan, Cornwall.

335. BORNITE, massive, iridescent.

Cornwall.

336. BORNITE.

North Huel Fortune, near South Molton, parish of East Buckland, North Devon.

Presented by J. Frantham.

Shelf IV.

337. BORNITE, crystallized.

Huel Buller, Redruth, Cornwall.

338. BORNITE, crystallized, with copper pyrites, having a variegated tarnish.

Carn Brea Mine, Illogan, Cornwall.

339. BORNITE, crystallized in spheroidal groups.

Huel Buller, Redruth, Cornwall.

340. BORNITE, crystallized.

Carn Brea Mine, Illogan.

341 & 342. BORNITE, crystallized.

Carn Brea Mine, Illogan, near Redruth, Cornwall.

Shelf V.

TENNANTITE, an ore containing about 48 per cent. of copper, combined with sulphur, arsenic, &c.; not found abundantly.

343. TENNANTITE, with Bornite, amorphous.

Tresavean Mine, Gwennap, Cornwall.

344. TENNANTITE, minutely crystallized upon copper pyrites.

345. TENNANTITE, minutely crystallized.

Cornwall.

Presented by G. B. Greenough.

346. TENNANTITE, well crystallized.

Huel Jewel, Gwennap, Cornwall.

347. TENNANTITE, well crystallized.

West Huel Jewel, Gwennap, Cornwall.

Shelf VI.

Fahlerz, (Tetrahedrite,) an ore very variable in composition, containing from 30 to 40 per cent. of copper, combined with sulphur, antimony, arsenic, zinc, iron, and often a very notable amount of silver or of mercury ; little known in England, but an important ore in Saxony, Hungary, Bohemia, &c.

348. Fahlerz coated with copper pyrites, and associated with argentiferous Galena.
Herodsfoot Mine, Liskeard.

349. Fahlerz, crystallized in tetrahedrons, but disguised under a coating of iron pyrites.
Great Crinnis Mine, St. Blazey, Cornwall.

350. Fahlerz, argentiferous, well crystallized in tetrahedrons.
Great Crinnis Mine, St. Blazey, Cornwall.

351. Fahlerz, and galena, crystallized ; the Fahlerz crystals alone being invested with a coating of crystallized copper pyrites.
Near Liskeard, Cornwall.

Bournonite, Endellionite, (*an timonio-sulphide of lead and copper*).

352. Bournonite.
Near Liskeard, Cornwall.

353. Bournonite, well crystallized, partly incrusted with quartz.
Near Liskeard, Cornwall.

354. Bournonite, crystallized with very brilliant facets, upon crystallized quartz.
Herodsfoot, near Liskeard. 1859.

Shelf VII.

355 to 359. Copper Pyrites continued; large specimens externally tarnished, and iridescent.
From Knockmahon, Ireland.

Shelf VIII.

360 to 362. Large specimens of Copper Pyrites.
From the lode at Vigra Mine, near Dolgelly, Merionethshire, North Wales.
Presented by J. Harvey.

Wall Case 8.

Tin Ore.

Cassiterite, Tin-stone, or Tin ore, (*Oxide of Tin*), contains tin, 78·62 ; oxygen, 21·38. The metal tin is extracted from this one species of ore only, which has not been found in remunerative quantity in any other part of the kingdom than Cornwall and Devon. In those western counties it has been known and worked from remote antiquity, whilst the ores of copper were neglected till within a recent period.

The tin ore when *dressed* or prepared for the smelter is termed *black tin*, and the metal produced by smelting, *white tin*.

About 170 mines in Cornwall and Devon yield tin ores, and the total quantity of metallic tin produced from them in 1863 was 10,006 tons, of the value of 1,170,702*l*.

Shelf I.

363. Cassiterite, crystallized and massive.
Bosorne Mine, St. Just, Cornwall.

364 to 366. Cassiterite, massive.
From the Mines of Botallack and Balleswidden, St. Just.

367. Cassiterite, very rich sample, crystallized and massive.
Huel Owles, St. Just.

368. Cassiterite.
Balnoon Mine, St. Ives, Cornwall.

369. Cassiterite, crystalline, and massive.
Providence Mine, St. Ives.
From the Exhibition of 1851.

370. Cassiterite (Tin-stone, or tin ore).
Cornwall.

Shelf II.

371. CASSITERITE, and Quartz.
Tregarva Mine, near Penzance, Cornwall.

372. CASSITERITE.
Huel Gwallon, Marazion, Cornwall.

373 & 374. CASSITERITE, with Quartz and Chlorite.
Great Work Mine, Breague, Cornwall.
Presented by J. Sylvester.

375, 376, & 377. CASSITERITE, massive, compact.
Huel Vor, Breague.
Presented by J. Sylvester.

378. CASSITERITE, crystalline, disseminated.
Pednandrea United Mines, Redruth, Cornwall.
Presented by N. Lockyer.

379. CASSITERITE, with Mispickel (*arsenical iron pyrites*).
Pennance Mill Mine, Falmouth, Cornwall.

Shelf III.

380. CASSITERITE, a rich branch, crystalline.
Dolcoath Mine, Camborne, Cornwall.
Presented by Captain Petherick.

381. CASSITERITE.
Huel Kitty, St. Agnes, Cornwall.
Presented by R. Davey, M.P., F.G.S.

382. CASSITERITE, massive.
From a Tin lode at Huel Kitty, St. Agnes, Cornwall.

383. CASSITERITE, crystallized with Mica and Quartz.
From Trumpet Mines, Wendron.
Presented by Fr. Hill, F.G.S.

384. Part of a very rich branch of TINSTONE, crystalline.
Beam Mine, St. Austell, Cornwall.

385. CASSITERITE.
St. Austell, Cornwall.

386 & 387. CASSITERITE, crystallized, disseminated through the "country," or rock (granite) adjacent to a tin lode.
Roche, near St. Austell.

388. CASSITERITE, crystallized and imbedded.
Huel Mandlin, Bodmin, Cornwall.

389. CASSITERITE, white, or greyish-white variety.
St. Agnes, Cornwall.

Shelf IV.

390 & 391. CASSITERITE, largely crystallized and partly imbedded, crystals semi-transparent.
Cornwall.

392. CASSITERITE, crystals in chloritic Slate.
Relistian Mine, near Hayle, Cornwall.

393 to 395. CASSITERITE, crystallized.
Great Work, Breague, Cornwall.
Presented by J. Sylvester.

396 & 397. CASSITERITE, in ditetragonally terminated crystals, locally termed "SPARABLE TIN," upon Chlorite.
From the 260 fathoms level, Dolcoath Mine, Camborne, Cornwall. 1859.

398. CASSITERITE, crystallized in acute tetragonal pyramids, termed "Sparable Tin," in chloritic Slate.
Huel Nancy, Camborne, Cornwall.

399. CASSITERITE, largely crystallized on the "wall" or side of a tin lode in Granite.
Beam Mine, St. Austell, Cornwall.

400. CASSITERITE, detached crystals of "Sparable Tin."
Mandlin Mine, Bodmin, Cornwall.

401. CASSITERITE, large crystals in granite.
Cornwall.

402 & 403. CASSITERITE, in well-defined crystals.
St. Agnes, Cornwall.

404. CASSITERITE, well crystallized, and semi-transparent.
Cornwall.

Shelf V.

405. CASSITERITE, coloring quartz.
Cornwall.

406 & 407. CASSITERITE, varieties "TOADS EYE" and "WOOD TIN" (*fibrous binoxide in concentric laminæ*).
Royal Polberro Consols, St. Agnes, Cornwall.

408. Macle or twin Felspar crystal replaced, partly by OXIDE OF TIN, and partly by sandy Mica.
Huel Coates, St. Agnes, Cornwall.

409. Macle and twin Felspar crystals replaced by micaceous sand.
Huel Coates, St. Agnes.
Presented by W. Hoskins.

410. CASSITERITE, pseudomorphous, after macle crystals of Felspar.
Huel Coates, St. Agnes.
Presented by W. Hoskins.

411 & 412. CASSITERITE, pseudomorphous, or in crystal forms which prove that it has taken the place of crystals of Felspar, formerly existing in the Porphyry.
Presented by the late J. Garby.
These very remarkable crystals occurred in millions a few years ago in Huel Coates, St. Agnes, whence they have found their way as cabinet specimens to every civilized country in the world.

STREAM TIN.

"STREAM TIN," (Pebble Tin Ore,) or that which is found in gravels, clays, &c., near the surface, similarly to the gold of the "diggings."

413. Part of a pebble of STREAM TIN, consisting of variety "Wood tin," and quartz.
Cornwall.

414. STREAM TIN.
Cornwall.

Shelf VI.

415, 416, & 417. STREAM TIN, variety "Wood tin," in small pebbles and sand.
From the vicinity of Penzance, Cornwall.

418. STREAM TIN, conglomerate, called "Ram tin."
Cornwall.
Presented by G. B. Greenough, F.R.S.

419. Pebble of STREAM TIN.
Carnon Stream Works, near Truro, Cornwall.
The bed was worked for some years under the tidal river.

420. STREAM TIN, a large pebble, itself formed of angular fragments cemented by tin ore.
From Carnon Stream Works, near Truro, Cornwall.
Presented by J. Garby.

421 to 423. Pebbles of STREAM TIN.
Carnon.
Presented by J. Enys and Sir H. De la Beche.

424 to 426. Pebbles of STREAM TIN. (424, variety "Wood tin; No. 426, crystalline Cassiterite.)
Pentuan Stream Works, near St. Austell, Cornwall.
Presented by Captain Paul.

427. Small pebbles of STREAM TIN.
Pentuan.
Presented by Sir H. De la Beche.

428. STREAM TIN, sand from the washings.
St. Austell, Cornwall.
Presented by G. B. Greenough.

429. Portion of a large pebble of STREAM TIN.
Near St. Austell.

430 to 435. Pebbles of STREAM TIN.
Bodmin Moor, and Red Moor, near Bodmin, Cornwall.
Presented by Sir H. De la Beche.

435a. OXIDE OF TIN.
From Smith's Wood Mine, near Ashburton, Devonshire.
Presented by M. Parkinson.

Shelf VII.

436. Mass of CASSITERITE, or Tinstone.

From Ding-dong Mine, near Penzance, Cornwall.

Presented by Sir H. De la Beche.

Characteristic specimens of productive tin lodes. Several from the Exhibition of 1851.

437 & 438. CASSITERITE, large crystalline masses (very rich samples).

From a lode in Granite, Huel Owles, St. Just, Cornwall.

439. TINSTONE, with Fluor and Quartz.

Maudlin Mines, Cornwall. 1862.

440. CASSITERITE, roughly crystallized.

Kithill Mine, Callington. 1862.

Presented by J. Bayly.

441. Rich branch of CASSITERITE.

Balleswidden, St. Just.

Mine worked since 1833; employs 520 persons, and sells 26,000*l.* of Tin annually. 1851.

Shelf VIII.

442. Part of a TIN LODE in granite.

From the 142 *fathoms level, Huel Spearne, St. Just.* 1851.

Mine worked since 1840; employs 180 persons, and sells 6,000*l.* of Tin annually.

443. Rich TIN ORE.

From Bishop's lode, Wendron Consols Mine.

Presented by Fr. Hill, F.G.S. 1862.

444. Mass of TINSTONE (Cassiterite).

From a lode in Granite, 110 *fathoms level, Providence Mines, near St. Ives.*

Mine worked since 1830, and employs 123 persons. 1851.

445. Part of a TIN LODE in Granite.

From the 202 *fathoms level, Reeth Consols, St. Ives.*

Mine in work since 1837; employs 280 persons, and sells 12,000*l.* of Tin annually. 1851.

446. Mass of TIN ORE.

From a lode in Clay-slate, 40 *fathoms level, Friendly Mines, near St. Agnes, Cornwall.* 1851.

WALL CASE 9.

TIN PYRITES, Stannine; Bell-metal Ore (*Sulphide of Tin*); consists of tin, 27; copper, 30; iron, 13; sulphur, 30.

A mineral of extremely rare occurrence out of Cornwall, where it is known only in three or four localities.

Shelf I.

447. TIN PYRITES, crystalline.

Cornwall.

448. TIN PYRITES, crystallized and massive.

Carn Brea Mine, near Redruth, Cornwall.

Presented by T. J. Hill.

448a. TIN PYRITES, with Mica.

Carn Brea Mine, Cornwall.

449. TIN PYRITES, massive granular.

South Crofty, Camborne, Cornwall.

Presented by R. Pearce.

450. TIN PYRITES, massive compact.

Huel Rock, St. Agnes.

The original locality.

ORES OF BISMUTH.

Shelf II.

451. NATIVE BISMUTH, crystalline and massive.

Dolcoath Mine, Camborne, Cornwall.

Presented by Captain Provis, 1859.

452 & 453. NATIVE BISMUTH, crystalline, and massive granular.

Dolcoath Mine, Camborne.

453a. NATIVE BISMUTH, with Fluor.

Dolcoath Mine, Camborne.

Presented by J. Garby.

454. NATIVE BISMUTH, disseminated.

Botallack Mine, St. Just, Cornwall.

Presented by the late Joseph Carne, F.R.S.

455 & 456. NATIVE BISMUTH, disseminated through brown iron ore.

Restormel Mine, Lostwithiel, Cornwall. 1857.

Shelf III.

457. NATIVE BISMUTH, disseminated.

Treburget United Mine, near Camelford, Cornwall.

458. NATIVE BISMUTH.

Cornwall.

459. NATIVE BISMUTH, brilliant crystalline specimen, showing the rhombohedral cleavage.

St. Ives Consols, Cornwall.

460. BISMUTHINE, or Bismuth-glance (*Sulphide of Bismuth*).

Prideaux Wood Mine, St. Blazey Cornwall.

Presented by Captain Simmons.

461. BISMUTHINE, acicularly crystallized in cavities in Copper Pyrites.

Lanescot Mines, now called Fowey Consols, St. Blazey.

Presented by Sir H. De la Beche.

462 to 464. BISMUTHINE, in acicular crystals.

Fowey Consols, St. Blazey, Cornwall.

465. NEEDLE-ORE, (Aikenite) or Acicular Bismuth (*Sulphide of Bismuth, Lead, and Copper*).

Fowey Consols, St. Blazey, Cornwall.

ORES OF NICKEL AND COBALT.

Nickel and Cobalt are metals never found *native* or in the metallic state. Their ores, frequently associated together, are rare in this country, but are highly valued in consequence of the employment of the former for certain white "metals" or alloys, and of the latter for colouring porcelain.

Shelf IV.

466. KUPFERNICKEL, Nickeline (*Arsenide of Nickel*), containing in its purest state, nickel 44, and arsenic 56.

From St. Austell, Cornwall.

467 & 468. KUPFERNICKEL, with arsenical-cobaltic Pyrites.

Fowey Consols, St. Blazey, Cornwall.

468a. KUPFERNICKEL with MILLERITE (*Sulphide of Nickel*).

Fowey Consols. 1860.

469 to 471. KUPFERNICKEL.

Pengelly Mine, St. Austell, Cornwall.

Obtained 1818.

472 & 473. KUPFERNICKEL, with Copper and Iron Pyrites.

Pengelly Mine, St. Austell.

Presented by P. N. Johnson, F.R.S.

474. NICKELIFEROUS PYRITES.

From a "cross-course," Fowey Consols, St. Blazey, Cornwall.

475. MILLERITE (*Sulphide of Nickel*), capillary crystals occurring in cavities of the argillaceous Ironstone called "Elled balls."

Ebbw Vale Ironworks, South Wales.

Presented by W. Adams, F.G.S.

476. MILLERITE, or capillary Pyrites, occurring in the cracks of a clay ironstone nodule.

Clyne Wood, near Swansea.

Presented by L. Dillwyn, M.P.

477 & 477a. COBALT NICKEL ORE.

St. Austell Consols, Cornwall.

Presented by Captain Williams.

478. COBALT NICKEL ORE, and arsenical Pyrites.

Dolcoath, Camborne, Cornwall.

Presented by Captain Petherick.

ARSENICAL COBALT ORES.

479 & 480. SMALTINE, or Tin-white Cobalt (*Arsenide of Cobalt, Iron, and Nickel*).

Huel Sparnon, near Redruth, Cornwall.

Shelf V.

481. SMALTINE, massive.

Dolcoath, Camborne, Cornwall.

482 & 483. ARSENICAL COBALT ORE.

Huel Clarence, near Redruth, Cornwall.

484. ARSENICAL COBALT ORE, massive.

Huel Elizabeth, St. Ives, Cornwall.

485. Arsenical Cobalt Ore, with strings of native Silver.
Widworthy, Devon.
Presented by G. B. Greenough, F.R.S.

486. Arsenical Cobalt Ore.
From a "cross-course," Coniston Mines, Cumberland.
Presented by John Barratt.

487. Cobalt-bloom, Erythrine, or Red Cobalt Ochre, (*Arseniate of Cobalt*).
Huel Sparnon, Redruth, Cornwall.

488. Cobalt-bloom, incrusting Hornstone, from a lode in the bay west of Bonmahon Head, occurring in Serpentine and Hornstone.
County Waterford, Ireland.

489. Cobalt-bloom, stellated and pulverulent.
Killarney, Ireland.
Presented by G. B. Greenough.

490 & 491. Cobalt-bloom (*arseniate*), occurring as an incrustation on Grey Cobalt (*the arsenide*).
Huel Sparnon, Redruth, Cornwall.

492 & 493. Cobalt-bloom.
Bonmahon Head, County Waterford, Ireland.

494 & 495. Cobalt-bloom.
Tyndrum, Perthshire, Scotland.
Presented by the late Marquis of Breadalbane.

Ores of Wolframium or Tungsten.

Shelf VI.

496. Wolfram (*Tungstate of Iron and Manganese*).

497. Wolfram, crystalline.
St. Agnes, Cornwall.

497a. Wolfram, with Copper Pyrites and Mispickel.
Carn Brea Mines, Cornwall.

497b. Wolfram, in quartz, associated with Tin Ore, &c.
CliggaHead, Cornwall.

498 to 500. Wolfram, various specimens, associated with Tinstone and Quartz.
From Drakewalls Tin Mine, Callington, Cornwall.
Presented by W. W. Smyth, F.R.S.

500a. Wolfram, crystalline and massive.
Near Tavistock, Devonshire.

500b. Wolfram traversed by veins of Copper Pyrites.
East Pool Mine, Redruth. 1862.

500c. Wolfram-ochre (*Oxide of Wolfram, Scheelic or Tungstic acid*).
East Pool Mine, Redruth.

500d. Scheelite (*Tungstate of Lime*), crystallized on Quartz.
Carrockfells, Cumberland.

Shelves VII. and VIII.

Various large specimens of Tinstone; from the Great Exhibition of 1851.

501 & 502. Slabs of Tinstone, variety called "Rosin Tin," from the Vounder lode in Granite, containing 74 per cent. of Tin ore, of the value of 60*l.* per ton.
West Par Consols, St. Blazey, Cornwall.
Presented by J. W. Welborne.

503 & 505. Tinstone (Cassiterite), from a lode in Clay Slate.
St. Agnes Consols, now called Polberro Consols, Cornwall.

504. Tinstone.
Great Work Mine, Breague, Cornwall.
Presented by J. Sylvester.

506. Tinstone, large mass of.
Budnick Consols, Perranzabuloe, Cornwall.
Presented by J. Enys, F.G.S.

507. Part of a Tin lode in Clay Slate, from the 25 fathoms level.
Huel Rock, St. Agnes, Cornwall.

N.B.—Wall-cases 10 and 11 are occupied by metallurgical products.

Ores of Zinc.

From 10,000 to 15,000 tons of the ores of Zinc are probably raised annually from the British mines, but this amount is far from supplying

the requirements of the country, and there are annually imported from 22,000 to 24,000 tons of metallic Zinc or Spelter, from Belgium and Prussia.

BLENDE, or ZINC-BLENDE, "Black Jack," and "Mock Ore" of the miners (*Sulphide of Zinc*); zinc, 67; sulphur, 33.

WALL CASE 12.

Shelf I.

508. BLENDE: This specimen is apparently the top of some large crystals of Blende, covered by quartz crystals; as is very common in Cornwall, portions of Copper Pyrites are enveloped in the Sulphide of Zinc.

From Huel Fortune, Marazion, Cornwall.

Presented by Sir H. De la Beche.

509. BLENDE, massive, crystalline, occurring with Calcite and Galena.

Milltown Lead Mine, County Clare, Ireland.

Presented by W. W. Smyth, F.R.S.

510. BLENDE, crystallized, and coated with crystals of Calcite and Iron Pyrites.

Talar Goch Mine, Flintshire.

Presented by Captain Ishmael Jones, 1851.

511. BLENDE, with Galena.

Caegwernog and Berthllwyd Silver-lead Mines, Llanelltyd, near Dolgelly, North Wales.

Presented by J. Harvey.

512. BLENDE, auriferous, with Galena.

Prince of Wales Mine, near Dolgelly, Merionethshire.

Shelf II.

513. BLENDE, crystallized with Calc Spar, on Sandstone.

Grassington Mines, near Skipton, Yorkshire.

Presented by Captain Eddy.

514 & 515. BLENDE, crystallized.

Nent Head, Cumberland.

516. BLENDE, opaque black variety, crystallized on Limestone.

Aldstone Moor, Cumberland.

517. BLENDE, incrusted with crystals of Quartz.

Nent Head, Aldstone Moor.

Presented by And. Smith.

Shelf III.

518. BLENDE, crystallized on Quartz.

Aldstone Moor.

519. BLENDE, crystallized with Quartz, and encrusting Fluor-spar.

Northumberland.

520. BLENDE, crystallized with Fluor-spar.

Northumberland.

521. BLENDE, black opaque variety, crystallized and massive.

522. BLENDE, crystallized.

Huel Kitty, St. Agnes, Cornwall.

523. BLENDE, massive, crystalline.

Huel Hope, Gwennap, Cornwall.

524. BLENDE, with Quartz.

Shelf IV.

525. BLENDE, massive, crystalline.

Flintshire, North Wales: locally called "Flintshire Jack."

526. BLENDE, crystallized and massive.

527. Veins of BLENDE in Silurian slates.

From the Lead Mine, near Llyn-y-Parch, Bettws-y-Coed, Caernarvonshire, North Wales.

528 to 530. BLENDE, crystallized with calcite and copper pyrites, in the Mountain Limestone.

Staunton Harold, Ashby de la Zouch, Leicestershire.

531. BLENDE, occurring in the clay Ironstone of the Coal Measures.

South Staffordshire.

Presented by W. W. Smyth, F.R.S.

532. BLENDE, crystallized in a cavity in Argentiferous Galena.

Goginan Lead Mine, near Aberystwith, Cardiganshire.

Presented by G. Fosset.

533. Blende (black variety), crystallized in octohedrons.
St. Agnes, Cornwall.

Shelf V.

534. Blende, yellow and transparent.
North Huel Tamar, Launceston.
Sulphide of zinc of this purity is extremely rare in Cornwall, the blende of that county usually being much mixed with variable proportions of iron. The lode whence this specimen was obtained has been worked for its lead, and it also contains some copper pyrites, and is brecciated, as may be seen by this specimen.
Presented by Sir H. T. De la Beche.

535. Blende, transparent, intermingled with Galena.
From the same Mine.

536. Blende, a large crystal, highly pure and transparent.
North Huel Tamar.

537. Blende (yellow transparent variety) crystallized.
Goonhavern Mine, North of Truro, Cornwall.
Presented by W. Driver.

538. Two small specimens of the same, showing very brilliant cleavage planes.

539. Blende, brown variety.
From near Truro.

540. White Blende (a very rare variety), crystallized, with Quartz.
Huel Barrow, St. Agnes, Cornwall.
Presented by Stephen Davey.

541. Blende, occurring in the Mountain Limestone.
Ecton, North Staffordshire.
Presented by W. W. Smyth, F.R.S.

542. Blende, with Quartz.
Strontian, Argyleshire, Scotland.

Shelf VI.

Cadmium, a mineral often associated with Zinc.

543 & 544. Greenockite (*Sulphide of Cadmium*), occurring in brilliant yellow hexagonal crystals, with Prehnite in a trap rock.
At Bishopton, Renfrewshire, Scotland, with Old Kilpatrick, the only known localities.
No. 544 presented by Earl Cathcart.

Electric-calamine; or Prismatic Calamine; Smithsonite, *of Brooke and Miller, (Hydrated Silicate of Zinc);* consisting of oxide of zinc, 67; silica, 26; water, 7.

545 to 547. Electric-calamine, botryoidal.
Fowey Consols, St. Austell, Cornwall.

548. Electric-calamine, botryoidal and mammillary, upon Blende, with a little carbonate.
From the 70 fathoms level of Way's lode, Great St. George Mine, Perranzabuloe.
Presented by W. W. Smyth, F.R.S.

549. Electric-calamine, colored with copper (Cupreous Silicate of Zinc).
Roughtengill, Cumberland.

Calamine; Lapis Calaminaris; Smithsonite, *of Dana, Haidinger, &c. (Carbonate of Zinc)*; consisting of oxide of zinc, 65; carbonic acid, 35.

550. Calamine, coating Blende.
Huel Mary, Lanescot, near Bodmin, Cornwall.

551. Calamine, stalagmitic, very pure.
Aldstone, Cumberland.
Presented by J. Taylor, F.R.S.

552 & 553. Calamine, stalagmitic, mammillated.
Farnberry Mine, Aldstone Moor, Cumberland.
Presented by Melville Attwood.

Shelf VII.

554. Calamine, botryoidal, and massive.
Aldstone Moor, Cumberland.

555. CALAMINE, impure earthy variety.
Castleton, Derbyshire.

556 & 557. CALAMINE, common impure variety.
From the Lead and Calamine Works, in the Mountain Limestone, Mendip Hills, Somersetshire.

558. CALAMINE, common earthy variety.
Whorle Hill, near Weston-super-Mare, Somersetshire.

558a. CALAMINE, newly discovered, 1862.
From Sheshodonnel, near Castletown, Co. Clare.

Shelf VIII.

559. BLENDE, black, fine crystallized specimen, with quartz encrusting.
Laxey Mines, Isle of Man.
Presented by Mr. Beckwith.

560. BLENDE, massive, crystalline.
From Laxey Mine.
Presented by Captain Rowe.*

560a. BLENDE and Galena crystallized.
Aldstone Moor.

ORES OF MANGANESE.

The ores of manganese occur in irregular repositories in Devon and Eastern Cornwall, in North Wales, &c., but are raised in only small quantity from the British islands. As they are largely employed, in part for the extraction of manganese and in part for yielding oxygen, the demand is chiefly supplied from the Continent.

Wall Case 13.

PYROLUSITE ; Prismatic Manganese Ore ; (*anhydrous binoxide*), contains about 63 per cent. of metal.

HAUSMANNITE ; Black Manganese ; (*anhydrous proto-peroxide of Manganese*), contains about 72 per cent. of metal.

MANGANITE ; Grey Manganese Ore ; (*hydrated peroxide*), contains about 62 per cent. of metal, and 10 per cent. of water.

PSILOMELANE ; compact Manganese Ore ; its chemical composition varies, but it contains, with oxide of manganese, water and baryta.

Most of the following specimens were presented by Sir Henry De la Beche.

Shelf I.

561. PSILOMELANE, botryoidal and massive.
Tresweeta, St. Stephens, Cornwall.

562 & 563. PSILOMELANE, massive, compact.
Brent Tor, near Tavistock, Devonshire.

564. PSILOMELANE.
Vicinity of Tavistock, Devonshire.

565. PYROLUSITE, crystallized, and massive.
Upton Pyne, near Exeter, Devon.

566. PYROLUSITE, occurs mingled with Hæmatite in a lode traversing Mountain Limestone.
At Owargoch, Newton Down, Glamorganshire.

Shelf II.

567. PSILOMELANE, mammillated, and stalactitic.
Brent Tor, Tavistock, Devonshire.

568. PYROLUSITE upon PSILOMELANE, lamellar, fibrous, fractured and re-cemented by nature.
Restormel, Lostwithiel, Cornwall.

569. PSILOMELANE, stalactitic, and massive.
Glandore, County Cork, Ireland.
Presented by Captain Tomkins.

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* A very fine specimen of ZINC-BLENDE, of highly crystalline character, associated with quartz, and exhibiting its massive occurrence in the Laxey lode, is placed in the pedestal case.

570. PSILOMELANE, stalactitic, botryoidal.
Glandore, County Cork.

571. PSILOMELANE, pseudomorphous and investing.
From the Iron lode at Restormel, Lostwithiel, Cornwall.

Shelf III.

572. PSILOMELANE, massive, compact, with crystallized Manganite.
Devonshire.

573. PSILOMELANE, mammillated.
Near Launceston, Cornwall.

574 to 580. PSILOMELANE, botryoidal, and stalactitic.
From the vicinity of Tavistock, Devonshire.

581. PSILOMELANE, reniform, compact, with Pyrolusite.
Black Down, Devonshire.

582. MANGANITE, massive.
Orleigh Court, Bideford, Devon.

583 & 584. PSILOMELANE, stalactitic and botryoidal.
Black Down, near Tavistock.

Shelf IV.

585. Dendrite of OXIDE OF MANGANESE.
From the "Wood-head hill" Sandstone, Lower Coal Measures, Brown Edge, Oldham, Lancashire.

586 & 587. PSILOMELANE.
Drygill, Cumberland.
Presented by H. L. Pattinson, F.R.S.

588. PSILOMELANE, and Manganite.
Gyrn du, near Clynog, Caernarvon, North Wales.

589. Stalactite of PSILOMELANE.
Black Down, Devonshire.

590 to 594. PSILOMELANE.
Restormel Royal Iron Mine, Lostwithiel, Cornwall.

595. PYROLUSITE.
From the Iron lode, Restormel.

Shelf V.

596. MANGANITE, crystallized in acicular diverging groups.
From veins in the Mountain Limestone, near Bristol.

597. MANGANITE, crystalline, divergent, columnar.
Hartshill, Warwickshire.
Presented by Richard Phillips, 1840.

598. MANGANITE, acicularly crystallized.
Presented by G. B. Greenough, F.R.S.

599. MANGANITE, in brilliant prismatic crystals.
Presented by G. B. Greenough, F.R.S.

600. PYROLUSITE, crystallized upon botryoidal PSILOMELANE.
Brent Tor, Tavistock, Devon.

601 & 602. PYROLUSITE, crystallized.
Tavistock.

603. MANGANITE, acicularly crystallized on quartz.
Restormel, Lostwithiel.

604. DIALLOGITE (*Carbonate of Manganese*), globular, and botryoidal; the exterior of the geode has been converted into manganite crystallized acicularly.
Hartshill, Warwickshire.
Presented by Richard Phillips, 1840.

605, 606, & 607. RHODONITE; Manganese spar (*Silicate of Manganese*), massive.
Black Down, near Tavistock, Devonshire.

608. EARTHY CARBONATE OF MANGANESE, pulverulent.
Parish of Tulla, eastern part of County of Clare, Ireland.
Presented by Sir Robert Kane.

ORES OF URANIUM, VANADIUM, TITANIUM, & MOLYBDENUM.

Shelf VI.

609. PITCHBLENDE (*Proto-peroxide of Uranium*), massive.
Huel Trenwith, St. Ives, Cornwall.
Presented by W. J. Henwood, F.R.S.

610. PITCHBLENDE, massive.
St. Ives Consols, Cornwall.
Presented by the late J. Garby.

611. URANITE, sub-species CHALCOLITE, or Torberite, (*Cu-*

preous Phosphate of Uranium), crystallized on quartz.
Gunnislake, Cornwall.

612. CHALCOLITE, or COPPER-URANITE, well crystallized.
Cornwall.

613 & 614. CHALCOLITE.
South Huel Basset, Illogan, Cornwall.
Presented by J. Garby.

615 to 617. CHALCOLITE (*Phosphate of Uranium and Copper*), crystallized.
Cornwall.

618. CHALCOLITE, in small brilliant crystals on "Gossan Ore."
Gunnislake Mine, Cornwall.

619. URANITE, sub-species AUTUNITE, or Lime-Uranite (*Phosphate of Uranium and Lime*).
West Huel Basset, Cornwall.

619a. URAN-OCHRE, Zippeite.

620. VANADINITE (*Vanadate of Lead*), in implanted globules, and incrusting.
Wanlock Head, Dumfriesshire, Scotland.

621 to 621b. RUTILE (*Oxide of Titanium*), in long striated crystals, and acicular, imbedded in Quartz.
Killin, Perthshire.
Presented by the Marquis of Breadalbane.

622. BROOKITE, tabular translucent crystal.
Tremadoc, North Wales.
Presented by the Rev. J. Williams.

623. ANATASE, minute pyramidal crystals in Chlorite.
Virtuous Lady Mine, near Tavistock.

624. MOLYBDENITE (*Sulphide of Molybdenum*), foliated, massive, disseminated.
Huel Unity, St. Day, Cornwall.

625. MOLYBDENITE.
Caldbeck Fells, Cumberland.

626. TELLURWISMUTH (*Sulphotelluride of Bismuth*), in Quartz.
Caldbeck Fells, Cumberland.

627 & 628. MOLYBDENITE, with Pyrites, vein in Porphyry.
Tomnadashan, Perthshire.
Presented by the Marquis of Breadalbane.

628a. MOLYBDENITE, occurring with quartz and copper ores in a dyke of Porphyry.
Tomnadashan, Lough Tay, Scotland.
Presented by W. W. Smyth, F.R.S., from the workings in progress, 1860.

ORES OF CHROMIUM.

Shelf VII.

629 to 631. CHROMITE (*Chromate of Iron*), massive and granular, associated with Steatite.
Glenlochy, near Killin, Perthshire.
Presented by the Marquis of Breadalbane.

632 CHROMITE, with CHROME-OCHRE (*Oxide of Chromium*).
Unst, Shetland.
Presented by D. Midgley.

633. CHROMITE or chromic Iron.
Unst.
Presented by Captain Vetch.

Shelf VIII.

634. CHROMITE, large mass.
Fetlar, Zetland.
Presented by Sir Arthur Nicholson.

ANTIMONY ORES.

The ores of Antimony, a metal largely employed for alloys, and in medicine, are at present obtained in unimportant quantity from British mines.

WALL CASE 14.

Shelf I.

635 & 636. ANTIMONITE, or Antimony-glance (*Sulphide of Antimony*), columnar and granular.
From a lode, Endellion, Cornwall.

637 & 638. ANTIMONITE.
Castell Diganwy, near Conway, North Wales.

Shelf II.

639. ANTIMONITE, massive granular.
Endellion, Cornwall.

640. ANTIMONITE, granular.
Isle of Man.

641. ANTIMONITE, crystallized.
Near Newcumnock, Ayrshire.
Presented by S. Girdwood.

642. JAMESONITE (*Sulphide of Lead and Antimony*), massive, fibrous.
Huel Boys, Endellion, Cornwall.

643 & 644. JAMESONITE, fibrous, with BLEINIERE encrusting.
Endellion.

645. BLEINIERE, or Antimonite of Lead, the result of the decomposition of Jamesonite.
Endellion, Cornwall.

Shelf III.

646. BOURNONITE (*Sulphide of Lead, Copper, and Antimony*), crystals with iridescent tarnish.
Liskeard, Cornwall.

647. BOURNONITE (*Antimonio-cupriferous Lead-ore*), massive.
Near Liskeard.

648 & 649. BOURNONITE, crystallized with Quartz.
Liskeard, Cornwall.

GOLD.

Gold has been found from time immemorial in minute particles with the tin-ore in the stream works of Cornwall. At the end of last century it was discovered in more important quantity in the valleys at the base of the mountain Croghan Kinshela, in Wicklow. Within the last few years several remarkable gold-bearing veins have been found in North Wales.

Shelf IV.

650. NATIVE GOLD; stream gold, as obtained in pebbles and grains from the Tin Stream Works,
Carnon, near Truro, Cornwall.

651. NATIVE GOLD, as obtained in grains and small nuggets, from the washings.
Wicklow, Ireland.

652. NATIVE GOLD, six larger nuggets.
From the same locality.

653. Pebble of Magnetic Iron from the detritus sand.
Wicklow Gold Mines.

654 & 655. NATIVE GOLD, with Blende and Copper Pyrites.
In a quartzose lode, Clogau Mine, near Dolgelly, North Wales.
Presented by James Harvey.

656. NATIVE GOLD, disseminated in Quartz with Blende.
Dolfrwynog, near Dolgelly, North Wales.

657 to 660. NATIVE GOLD, disseminated through Quartz, Blende, and Galena.
Cwm-y-swm Mine, near Dolgelly, Merionethshire.
Presented by J. Bruin.

661 & 662. DRESSED GALENA, rich in gold.
Cwm-y-swm Mine, near Dolgelly.
Presented by J. Bruin.

ORES OF SILVER.

About 562,000 ounces of silver are annually produced from the British mines, but almost the whole of this amount is derived from the comparatively small per-centage present in the argentiferous lead ores, for which *see* Wall-cases 43, 44, 45, eastern side.

Shelf V.

663. NATIVE SILVER.
In the gossan of Treathan's lode, Fowey Consols, St. Blazey, Cornwall. 1858.
Presented by Captain Puckey.

664. Strings of NATIVE SILVER, with GANOMATITE or CHENOCOPROLITE (Goose-dung ore).
Dolcoath, Camborne, Cornwall. 1860.

665. Native Silver, and Silver-glance (*Sulphide of Silver*).
Dolcoath, Camborne.
Presented by Captain Petherick.

666 to 668. Native Silver, and Silver-glance.
Herland Mine, Parish of Gwinnear, near Camborne.
Presented by W. J. Henwood, and J. Carne, F.R.S.

669. Silver-glance, or vitreous silver (*Sulphide*).
Lanescot Mines, Fowey, Cornwall.
Presented by P. N. Johnson, F.R.S.

670 & 671. Silver-glance, crystallized.
Cornwall.

672. Silver-glance, crystallized and massive, with Siderite.
Huel Brothers, near Callington, Cornwall.
Presented by Richard Davey, M.P.

Shelf VI.

673. Silver Ore (Fahlerz?).
In the gossan of cross course, Beacon Mine, Lostwithiel, Cornwall.
Parcels sold at 28*l.*, 9*l.* and 17*l.* per ton, August 1855.

673a. & 673b. Argentiferous Gossan, from the Silver Vein Mine, near Lostwithiel; and slag and metal obtained from same by Squire's process.
Presented by R. W. Gold.

674, 675, 676. Pyrargyrite, or Ruby-silver, (*Sulphide of Silver and Antimony,*) massive, granular, and crystallized, with arsenical Pyrites.
Dolcoath Mine, Camborne, Cornwall.
Presented by Captain W. Petherick.

677. Pyrargyrite, fine crystals in a cavity in Siderite.
Huel Duchy, Callington, Cornwall.

678. Pyrargyrite, with Siderite (Spathose iron).
Huel Brothers, Callington.
Presented by R. Phillips, F.R.S.

679. Pyrargyrite, incrusting white Killas.
Huel Brothers, Callington.

680 & 681. Pyrargyrite, massive, and crystallized upon arsenical Pyrites.
Dolcoath, Camborne.
Presented by Captain Petherick.

682 & 683. Arsenical Silver Ore.
Dolcoath.
Presented by Captain W. Petherick.

684 & 685. Horn-Silver (*Chloride of Silver*), crystallized and massive.
North Dolcoath Mine, Camborne.
Presented by Richard Pearce.
No. 684 being part of the first stone found by Captain W. Thomas, 1859. This rich ore formed a "bunch" at and above the 10-fathom level, and "cut out" entirely on all sides.

686. Horn-Silver, delicately acicular, in Iron Ochre.
Mexico Works, Cornwall.
Presented by G. B. Greenough, F.R.S.

Shelf VII.

Various specimens of Silver Ores,
From the Isle of Sark.
Presented by P. N. Johnson, F.R.S.

687 to 689. Horn-Silver, and Carbonate of Lead.
Sark's Hope Mine.

690 to 694. Silver Ore, consisting chiefly of Argentiferous Galena.

695 & 696. Freieslebenite? (Sulphide of Silver, Lead, and Antimony), with Iron Pyrites in the one, and Galena in the other specimen.
From the 30 and 50-fathom levels, Sark's Hope Mine.

697. Carbonate and Arseniate of Copper, argentiferous.
Le Pot Copper Lode Cutting, Sark's Hope.

Shelf VIII.

Arsenic.

Arsenical Iron Pyrites (Mispickel), is employed for the preparation of Arsenic, of which it yields about 45 per cent.

It forms a constituent part of many of the lodes of copper and tin in Cornwall and Devon, and is generally termed by the miners *arsenical mundic*. The well known poisonous substance white arsenic (*arsenious acid*) is produced from this ore at our western mines to the amount of from 1,400 to 1,600 tons per annum.

698 & 699. MISPICKEL, massive.
Dolcoath, Cornwall.
Presented by Captain Petherick.

700. MISPICKEL, crystalline, irregularly columnar.
Huel Maudlin, near Lostwithiel.

701. MISPICKEL, massive.
Calstock United Mines, near Callington, Cornwall.

702 & 703. MISPICKEL, with Copper Pyrites, crystallized and massive.
Virtuous Lady Mine, Tavistock, Devonshire.

704. MISPICKEL, massive, in Quartz.
Faithleg, County Waterford.

705. MISPICKEL, massive.
Calstock United Mines, near Callington, Cornwall.

ORES OF LEAD.

The metal Lead is extracted almost exclusively from the ore called Galena, (Sulphide of Lead,) a mineral of bluish-gray colour, crystallizing in cubes, octohedrons, and other forms derived from these. It is composed, when in the condition of greatest purity, of

Lead 86·58
Sulphur 13·42

Galena almost always contains a small proportion of silver, varying from 2 ozs. per ton of lead in our Midland limestone districts, and 14 ozs. in the Northern and Welsh limestones, to as much as 80 ozs. per ton of lead in the clay slate regions of the Western counties, and to some occasionally higher per-centages in isolated cases in Cornwall, North Wales, and Ireland.

In the year 1856 there were produced, from 330 mines, in the United Kingdom 101,997 tons of lead ore, equivalent to 73,129 tons of metallic lead, from which were separated 614,188 ozs. of silver.

In 1863 the quantities raised were somewhat smaller, being 91,283 tons of lead ore, which produced 68,221 tons of lead, and 634,004 ozs. of silver.

The ores of lead occur in Cornwall and Devon in the clay slate or "killas" in regular veins or lodes, most of which course North and South; although a few take an opposite direction. They are largely worked also, in lodes coursing chiefly East and West, in the carboniferous limestone of Derbyshire, Flintshire, Yorkshire, Cumberland, Northumberland, and Durham, and in the millstone-grit of Yorkshire; in East and West lodes in the clay slates of Shropshire and Wales; in lodes with various directions in the clay slate of the Isle of Man; in lodes intersecting granite in Scotland and Ireland; in pipe-veins, flats, and other irregular deposits in the limestone of Derbyshire, Yorkshire, and Ireland, and in small quantities in the coal-measures of several localities. The minerals associated with Galena are commonly iron-pyrites, zinc-blende, quartz, calcareous spar, barytes, and fluor spar, some of them being much more abundant than others in particular districts.

Veins or other repositories of galena frequently yield near the surface several of the minerals afterwards enumerated, which are occasionally also employed for the production of lead.

The specimens of Galena are arranged geographically, beginning with the South-western part of England.

EASTERN SIDE.

Wall Case 43 to 56.

Wall Case 43.

Shelf I.

1. Galena, massive, crystalline.
Huel Penrose, near Helston, Cornwall.
Presented by Alfred Broad.

2. Galena, unusually well crystallized, on a quartzose "gangue."
Besore Mine, St. Kea, near Truro, Cornwall.
From the Exhibition of 1851.

3. Galena, crystalline.
Huel Albert, Perranzabuloe, Cornwall.

4. Galena, a crystalline mass.
From the lead lode at Holmbush, (120 fathoms level), Callington, Cornwall.
Presented by Captain Lean, 1852.

4a. Galena, in triakis-octohedron crystals.
Herodsfoot Mine, Cornwall.

5. Galena, argentiferous, with green Fluor-spar and Blende.
From the 112 fathoms level, South Tamar Mine, Beer Ferrers, near Plymouth. 1855.
Presented by W. W. Smyth, F.R.S.

6 to 11. Specimens of Galena (Argentiferous).
From the various levels, down to 135 fathoms, of the Tamar Mines.
Presented by Messrs. Johnson and Cock.
These mines, and the last mentioned, are remarkable for their large yield in silver, and for being worked on a large scale beneath the tidal waters of the Tamar.

Shelf II.

12. Galena.
Devon and Courtnay Mine, near Tavistock, Devon.
Presented by W. M. Rendle.

13. Galena, crystallized on "Killas" or Clay Slate.
Devonshire.
Presented by Sir H. De la Beche.

Shelf III.

14. Galena, granular, mingled with Copper Pyrites.
Combe Martin, Devon.
Presented by Major Harding.

15. Galena (Argentiferous), coarsely granular.
Combe Martin.
Presented by Major Harding.

15a. Galena.
North Devon Silver Lead Mines, Combe Martin.
Presented by Thomas Fidler.

16. Galena, crystallized in combinations of the cube and octohedron.
Beer Alston Mine, Devonshire.

17. Galena, mingled with Calamine.
Shipham, Mendip Hills, Somersetshire.

18. Galena, crystallized in cubes.
From a lode in Mountain Limestone, Broadfield Down, Wrington, Somerset.
Presented by Mrs. Aveline.

19. Galena, crystalline.
Mendip Hills.
Presented by Mrs. Aveline.

20 & 21. Galena, crystallized.
Wrington Warren, Wrington, Somerset.
Presented by Mrs. Aveline.

22. Galena, massive, crystalline, attached to the "capel" or "cheek of the vein."
Nant y Mwyn Mines, Cilcwm. Caermarthenshire.
Presented by Captain Harris.

Shelf IV.

23 & 24. Argentiferous Galena, coarsely granular, with Clay Slate.
From the brecciated portion of the lode, Cwm Sebon Lead Mine, near Aberystwith, Cardiganshire.

25 & 26. ARGENTIFEROUS GALENA, massive, granular, and lamellar.
Tal-y-bont Mines, near Aberystwith.
Presented by Captain Eddy.

27. GALENA, massive crystalline.
Brynglas Lead Mine, near Aberystwith.

Shelf V.

28 & 29. ARGENTIFEROUS GALENA, coarsely granular.
Llanfair Clydogau Mine, Lampeter, Cardigaushire.
Presented by Dr. Quin.

30 and 31. ARGENTIFEROUS GALENA, massive, finely granular.
Daren Lead Mine, near Aberystwith.
Presented by Captain Paul.
(Average produce 32 ounces of silver per ton of lead.)

32. ARGENTIFEROUS GALENA.
Cwm Symlog Lead Mine, near Aberystwith.
Presented by Captain Reed.
This mine is remarkable as having been one of the richest of those which were worked by Sir Hugh Myddleton, two centuries since, and by which he acquired the fortune afterwards liberally expended in supplying London with water by the "New River."

33. GALENA, massive, finely granular.
Goginan Mine, near Aberystwith.
Presented by G. Fosset.

34. GALENA, with Copper Pyrites and Quartz.
Cardiganshire.

35. GALENA, crystalline, intermingled with Clay Slate.
From the brecciated portion of the lode, Henfwlch, Cardiganshire.

Shelf VI.

36. GALENA, with "gossan."
Manod Mountain, Ffestiniog, North Wales.
Presented by W. W. Smyth, F.R.S.
A lode coursing through porphyry on the Crownland, not worked for some years past.

37. GALENA, with Blende and Quartz.
Caegwernog and Berthllwyd Silver-lead Mines, near Dolgelly, Merionethshire, N. Wales.
Presented by James Harvey.

38 & 39. Steel-grained GALENA.
From Graigwen, Dinas Mowddwy Merionethshire.

40. Specimen of "country" with strings of GALENA,
From the same locality.

41. GALENA, crystalline, with Blende, and occurring in alternating layers with Calcite and Copper Pyrites.
Cwm y Swm or Cwm-heisian, Merionethshire.

42. GALENA, crystallized in rhombic dodecahedrons.
Ryd Low Farm, Tyntwll, Llanrwst, Denbighshire.
Presented by Robert Owen.

43. GALENA, crystallized in cubes, and coated with Calcite.
Cowarch Mines, near Dinas Mowddwy, Merionethshire.

44. GALENA, auriferous, and argentiferous.
Merioueths hire.

44a. GALENA.
Capel Bettws, Trelech ar Bettws, Caermarthen.
Presented by the Caermarthen United Lead Mining Company (L.)

45. GALENA, imbedded in Calc-spar.
Oernant, Pennachno, Yspytty Evan, Caernarvonshire.

Shelf VII.

46 & 47. GALENA.
Part of the lode at Caegwernog and Berthllwyd, near Dolgelly, Merionethshire.
Presented by J. Harvey.

48. GALENA, argentiferous, and auriferous.
Cwm-y-Swm Mine, Merionethshire, North Wales.
Presented by James Harvey.

49. Large mass of GALENA, crystalline.

Shelf VIII.

50. Large mass of ARGENTIFEROUS GALENA.
From the lode at Cae Gynon Mine, Cardiganshire.
From the Exhibition of 1851.

51. GALENA.
Minera Union Mine, near Wrexham, Denbighshire.
Presented by J. Morgan.

52. Mass of crystalline GALENA.
South Wales.

53. Mass of GALENA.
Bradda Mines, Isle of Man.
Presented by the Directors of the mining company.

WALL CASE 44.

Shelf I.

54. GALENA, spotted in Calcite.
Snailbeach Mine, Shropshire.

55. GALENA, massive crystalline, showing well the cubical cleavage, with iridescent tarnish.
Snailbeach Mine.

56. GALENA, associated with Chalcedony, in Limestone.
White Grit Mine, near Bishop's Castle, Shropshire.

57. GALENA, with corroded surface.
White Grit Mine.

58. Strings of GALENA in a vein of Calcspar and Quartz.
White Grit Mine.

59. Part of a vein of GALENA.
Rock House, Stiper Stones, near Bishop's Castle, Shropshire.

60. GALENA, crystallized with Calcspar.
Penalley Mine, Shropshire.

Shelf II.

61 & 62. Films of GALENA in joints of the "Blue flats" ironstone.
Wolverhampton, South Staffordshire.

63 & 63a. Films of GALENA in joints of the "White" ironstone of the Coal Measures.
Dudley.
Presented by W. W. Smyth, F.R.S.

64. GALENA, crystallized with Calcite.
Bwlchyrheyrn, Caernarvonshire.
Presented by Robert Owen.

65. GALENA, which has apparently been acted upon by some solvent, and exhibits very brilliant facets.
Talar Goch Mine, Flintshire.
Presented by Captain Ishmael Jones.

66. GALENA, massive, exhibiting well the cubical cleavage.
Jamaica Mine, Mold, Flintshire.

67 & 68. "BLUE-STONE:" contains sulphides of lead, zinc, copper, &c.
Pary's Mine, Anglesey.

Shelf III.

69. GALENA, silvery-white variety, massive crystalline.
Isle of Man.

70. GALENA, variety peculiarly coloured on the surface, crystallized in cubes, with the solid angles replaced by planes of the octohedron.
Laxey, Isle of Man.
Presented by W. W. Smyth, F.R.S.

71. Part of the LEAD VEIN at Mole Trap Mine, Cromford, Derbyshire; contains GALENA, and Cawk or Barytes.

72. GALENA, with crystals of Anglesite (sulphate of lead).
Golconda Mine, Hopton, Derbyshire.
Presented by J. Hubbersty.

73. Part of a LEAD LODE: Galena with Pyrites, &c.
Alport, Derbyshire.

74. GALENA, very massive, crystalline.
Winster, Derbyshire.
Presented by R. Galloway.

75 to 77. GALENA, light coloured variety, fine grained.
Crich, Derbyshire.
No. 76 exhibits an appearance of corroded surface, with crystals of fluor deposited in the eroded hollow.

Shelf IV.

78. GALENA, large cubes partly incrusted with Pearl-spar.
Grassington Lead Mine, near Skipton, Yorkshire.
Presented by the late Captain S. Eddy.

79. GALENA, crystalline, enclosing angular fragments of Grit-stone.
Grassington Mines, near Skipton.
Presented by Captain S. Eddy.

80 to 83a. GALENA, in strings, and imbedded in a matrix of fluor, quartz, and semi-opal.
Rodderup Fell, Aldstone Moor, Cumberland.

Shelf V.

84 to 86. GALENA, with Pearl-spar and Calcspar crystallized.
From a vein in Mountain Limestone, Nent Head, Aldstone Moor.

87. GALENA, with Copper Pyrites and Mispickel.
Nent Head, Aldstone.

88. GALENA, argentiferous, associated with Quartz and Fluor (contains 14 ounces of silver per ton of lead).
Smittergill Head lode, Aldstone.
Presented by W. W. Smyth, F.R.S. 1855.

89 to 92. GALENA, crystallized with Calcspar, Blende, and Quartz.
From the Nent Head veins, Aldstone Moor.

Shelf VI.

93. GALENA, with Blende and purple Fluor.
From the firestone sill or stratum, Rampgill vein, Nent Head, Cumberland.

94 and 95. GALENA, with Fluor-spar, Quartz, and Semiopal matrix.
Rodderup Fell vein, Aldstone Moor.

96. GALENA, with Aragonite.
Nent Head, Aldstone.

96a. GALENA, crystallized, with Bitter or brown Spar.
Aldstone Moor District, Cumberland.
Presented by W. R. Reynell.

97. GALENA, associated with Blende.
Rampgill vein, Nent Head.

98. GALENA, with Copper Pyrites and Blende.
Nent Head.

99. GALENA, with Black limestone.
Long Cleugh vein, Nent Head.

100. GALENA, crystallized, with Siderite (Spathose iron).
Cumberland.

101. GALENA, associated with Magnetic Pyrites.
Smittergill Head.
Presented by W. W. Smyth, F.R.S.

102. GALENA, argentiferous, exhibiting an appearance of corroded surfaces.
Allenheads, Northumberland.
Presented by W. W. Smyth, F.R.S.

103. GALENA, crystallized, with peculiarity of structure on the surfaces of the cubes, termed "seals" (by the miners).
Allenheads.
Presented by W. W. Smyth, F.R.S.

104. GALENA, crystallized with Fluor and Pearl-spar.
County of Durham.

Shelf VII.

105. Part of a vein of GALENA.
Colliery, near North Sunderland, Northumberland.
Presented by Sir Walter C. Trevelyan, Bart.

106. GALENA, associated with Witherite.
From the same vein.

107 to 109. GALENA.
From the Coal in the Earl's Colliery, Netherton, Northumberland.
Presented by the Earl of Carlisle.

110. GALENA, found in a lump of coal broken at Woolwich.
From Newcastle-upon-Tyne.
Presented by Lieut.-Col. Dundas.

111 and 112. PLUMBIFEROUS SANDSTONE, containing 8 per cent. of lead, and some silver.
Alderley Edge, Cheshire.
Presented by Mr. Mitchell.

Shelf VIII.

113. GALENA, associated with Iron Pyrites and Brown Spar.
Allenheads, Northumberland.
Presented by W. B. Beaumont, M.P.

114. GALENA, crystallized in large cubes, with Fluor spar: a "shode stone."
Cumberland.

115 and 116. GALENA, with naturally polished surface called "Slickensides."
From the wall or "cheek" of a slide or "fault," Grassington, Yorkshire.
Presented by his Grace the Duke of Devonshire.

WALL-CASE 45.

Shelf I.

The following series to No. 131 are from Strontian, Argyleshire, Scotland; and were presented by Sir James Miles Riddell, Bart., from the Exhibition of 1851.

117. GALENA, massive crystalline, with Calcite.

118. GALENA, crystallized with Iron Pyrites.

119. Mass of Strontianite, with GALENA interspersed.
Belsgrove, Strontian.

Shelf II.

120 & 122. GALENA, crystalline, with very brilliant cleavage planes.
Belsgrove.

121. GALENA, in cubo-octohedral crystals, imbedded in Strontianite.

123 & 124. GALENA, with Calcite.
Belsgrove.

Shelf III.

125 & 126. GALENA, with Calcite.
Smithy vein, Feedonald.

127. Part of the LEAD VEIN.
At Clashgoran, Strontian.

128. GALENA, crystallized in cubes, with dog-tooth spar (Calcite), on Quartz.

129 to 131. GALENA, crystallized.
Red vein, Feedonald.

132. Part of a quartzose LEAD VEIN.

Shelf IV.

133. "TUMBLERS," or lumps of Galena coated with black Oxide of Copper.
From the shallow levels of eastern part of Cronebane Mine, Co. Wicklow, Ireland.

134. Steel-grained GALENA.
Holyhill Mine, South of Bantry, Ireland.

135 & 136. ARGENTIFEROUS GALENA, with Quartz and Copper Pyrites.
Rooskar Silver Mines, West of Bantry.

137. GALENA, fine grained, with Copper Pyrites.
Tranastella brecciated lode, Bonmahon, Ireland.

138 & 139. GALENA, coarsely granular.
From a lode traversing Serpentine, between Tranastella and Danes Island.

140 to 143. Specimens of GALENA, with Barytes and spots of

Copper Pyrites, and in dark porphyritic rock.

From Newtonards, North Ireland.
Presented by J. Taylor, jun., F.G.S.

144. GALENA, well crystallized on Quartz.

Luganure Old Mine, Co. Wicklow.
Presented by G. B. Greenough, F.R.S.

145. GALENA.

Castlemaine, Co. Kerry.
Presented by G. B. Greenough, F.R.S.

146 & 147. GALENA, coarsely granular.

Ballyhicky Mine, Co. Clare.
Presented by J. Taylor.

The following ores of lead are found in smaller quantities and fewer localities than the Galena, and all of them which follow Bournonite are characteristic of moderate depth and of those portions of mineral veins where the original ore has been subjected to changes.

BOURNONITE, a definite compound of lead, copper, antimony, and sulphur, in the following proportions :—

Sulphur -	- 19·72
Antimony -	- 24·71
Lead - -	- 42·54
Copper -	- 13·03
	100

ANGLESITE, (*Sulphate of lead,*) so called from the Isle of Anglesey, one of the first localities where it was observed.

Sulphuric acid -	26·4
Protoxide of lead	73·6

CERUSSITE, (*Carbonate of lead,*) found occasionally in large quantities, and valued for producing a lead of pure quality. Like the last it crystallizes in forms of the prismatic or rhombic system.

It contains,—

Carbonic acid -	16·42
Protoxide of lead	83·58

The names VANADINITE, PYROMORPHITE, and MIMETITE are given to the compounds of oxide of lead with vanadic acid, with phosphoric acid, and arsenic acid, respectively. The second name is derived from πῦρ, *pur*, fire, and μορφὴ, *morphe*, shape, from its assuming crystalline forms when heated; the third from μιμητὴς, *mimetes*, an imitator, from assuming similar forms to the last. These two, variously called from their colours, green, brown, and yellow lead ores, crystallize in hexagonal prisms.

KAMPYLITE, from καμπυλὸς, *kampulos*, curved, in consequence of the curvature of the crystal faces, is a compound of arsenic and phosphoric acids with oxide of lead, coupled with chloride of lead.

It may probably be regarded only as a variety of the Mimetite.

Shelf V.

148. BOURNONITE (*Antimonio-cupriferous sulphide of lead*), crystallized with Iron Pyrites.

Herodsfoot Mine, near Liskeard, Cornwall.

149. ANGLESITE (*Sulphate of lead*).

Mona Mine, Anglesey.
Presented by F. Webster.

150 to 150b. ANGLESITE, crystallized.

Pary's Mine, Anglesey.

151. ANGLESITE, an unusually fine group of Crystals.

Cromford, Derbyshire.

152. CALEDONITE (*Cupreous Sulphato-carbonate of Lead*).

Redgill, Cumberland.

153. LINARITE, (*Cupreous sulphate of lead,*) in very fine crystals.

Redgill, Cumberland.

154. LINARITE, crystallized.

Lead Hills, Lanarkshire.

154a. LEADHILLITE (*Sulphato-tricarbonate of lead*).

Lead Hills.

155 and 155 a. VANADINITE (*Vanadate of lead*), in implanted globules.

Wanlock Head, Dumfriesshire.

155 b. VANADINITE, in crystals.

Wanlock Head.

156. VANADINITE, with Calamine and Plumbo-calcite.
Wanlock Head.

157. CERUSSITE, (*Carbonate of lead*), crystallized upon Hæmatite.
Huel Rose, Helston, Cornwall.

Shelf VI.

158. CERUSSITE, acicularly crystallized.
Cardiganshire, Wales.

159. CERUSSITE, crystalline, showing vitreous fracture.

160 & 161. CERUSSITE, crystallized.
Jamaica Mine, Flintshire.

162. CERUSSITE, White-lead ore (*compact earthy carbonate*).
Fron Fawnog Mine, Flintshire.
Presented by W. W. Smyth, F.R.S.

163. CERUSSITE, crystallized, and crystalline.
Brassington, Derbyshire.

164 & 165. Nodular WHITE-LEAD ORE.
Elton, Derbyshire.

166. CERUSSITE, acicularly crystallized.
Cumberland.

167. CERUSSITE, crystallized.
Scotland.
Presented by G. B. Greenough.

168. WHITE-LEAD ORE, incrusting excellent Galena, "Flot ore."
From the "Flots," Grinton Moor, Yorkshire, 1858.

169. BROWN PYROMORPHITE (*Phosphate of lead*), with CERUSSITE, crystallized upon Quartz.
Devils Bridge, Wales (a new locality).

170. GREEN PYROMORPHITE, "*Green Linnets*" (of the miners), crystallized.
Halkin Mountain, North Wales.
Presented by G. B. Greenough, F.R.S.

171. YELLOW PYROMORPHITE, crystallized, globular, upon Calamine.
Roughtengill, Cumberland.

172. YELLOW PYROMORPHITE, with Blue Calamine, on quartz.
From the same locality, together with Nos. 173, 174, *and* 175, *crystallized on quartz.*

Shelf VII.

176 to 178. CHROMIFEROUS PYROMORPHITE (*Chrome phosphate of lead*).
Roughtengill, Cumberland.

179 & 180. GREEN PYROMORPHITE, "Green linnets," well crystallized.
Cumberland.

181. PYROMORPHITE, "Green linnets," minutely crystallized.
Brassington, Derbyshire.

182. PHOSPHATE OF LEAD, coating a vein of Galena, showing the stages of decomposition.
Brassington.

183. GREEN PYROMORPHITE, "Green linnets."
Ballidon, Derbyshire.

184 & 185. GREEN PYROMORPHITE, minutely crystallized.
Brassington.

186. GREEN PYROMORPHITE, (Impure gossan ore).
Golden Valley, Bonsal, Derbyshire.

186a. GREEN PYROMORPHITE.
Huel Rose, near Helstone, Cornwall.
Presented by John Hunt.

Shelf VIII.

187 to 192. MIMETITE, variety, KAMPYLITE (*Arsenio-phosphate of lead*), magnificent specimens, crystallized mostly upon quartz, some with Barytes, and partly coated with Psilomelane.
From Drygill and Caldbeckfell, Cumberland.
Presented by the late H. L. Pattinson.

Ores of Iron.

The production of Iron forms so prominent a feature in the commercial industry of Great Britain, that a larger space is allotted in the Museum to its ores than to those of either of the other metals. The gradual revival of the iron trade of this country, from about the middle of the 18th century, and its enormous increase during the last two generations, constitute one of the most remarkable chapters in the history of civilization.

That iron ore was known in the time of the Romans to exist in England we learn from various evidence. The presence of Roman coins, some of them as early as Trajan, found in heaps of iron cinders near Monmouth, and again under similar circumstances in Sussex, proves that iron was made at a very early period from the red and brown oxides, commonly called hæmatites, which were found in the Forest of Dean and in Kent and Sussex, and which are similar to the ores which have from time immemorial been smelted by simple methods in the Apennines and the Pyrenees. These ores, reduced by the aid of charcoal, and often conveyed for long distances to the places where wood was abundant, were the great source of iron, until about the year 1740, when after more than a century of experiment, pit coal came into use in the blast furnace, and with it the poorer but abundant and contiguous clay iron ores of the coal measures began to be employed. The old localities of the once prized rust-coloured ores were gradually neglected, and in many cases utterly forgotten, or recognized only by some heap of cinders or the traditions of the country people ; but, as if by a new turn of Fortune's wheel, the revolution given to trade by the introduction of railways, has sought for new supplies of ore to satisfy the constantly increasing demands of the furnaces, and the ancient sites are in many cases again brought into operation.

The total production of Pig Iron, (the crude cast metal obtained from the smelting in the blast furnace,) was in 1863 no less than 4,510,040 tons, of the value of upwards of ten million pounds sterling. This vast amount, grown up to a Colossus from a mere germ of 180,000 tons in the year 1800, required for its production upwards of 9,000,000 tons of various classes of ore, a total to which nearly all our Western, Midland, and Northern counties contributed their quota.

Notwithstanding the magnitude of the interests concerned in the preparation of this indispensable metal, it will scarcely be credited that no systematic collection representing the workable ores of the Kingdom had been brought together until the Great Exhibition of 1851. The want was then supplied by the liberal exertions of Mr. S. H. Blackwell, ironmaster, of Dudley, who after the Exhibition presented them to this Institution, munificently adding a sum of 500*l.* towards their chemical analysis for the general advantage.* Mr. Blackwell's collection has been amalgamated with numerous specimens which had before been collected during the progress of the Geological Survey through the South-western counties, and the whole now represents with completeness all the notable iron mining districts of the country.

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* *Note.*—The analyses of a great number of the more important ores have been completed in the laboratory of the Museum, and published among the Memoirs of the Geological Survey, as the "Iron Ores of Great Britain," Parts I., II., III., IV.

Iron Pyrites, &c.

Before commencing with the ores from which iron is made, a case of minerals has to be noticed, which, although containing a large percentage of iron, are not employed for the production of that metal. Among these the following are the more important:

Iron Pyrites, Pyrite, Mundic, Brasses, Sulphur, under which various names it is locally known, is *bisulphide of iron*, containing in 100 parts :—

Iron - - -	45·77	Sulphur - - -	54·23

It is one of the minerals most largely diffused throughout the earth, and it is noticeable that this compound of sulphur and iron is di-morphous, one species being that commonly known under the above name, of a brassy yellow colour, and crystallizing in the cube and its derived forms ; the other being—

Marcasite, white, spear, or cocks-comb Pyrites, crystallizing in very different forms belonging to the Rhombic system of crystals, and generally of a paler colour than the former. For the production of sulphur or of sulphuric acid (oil of vitriol), these substances are largely employed, and besides being imported from Spain, Portugal, and Belgium, are so abundantly yielded by our own metalliferous mines, where they accompany copper ores, and sometimes form of themselves large veins, that about 100,000 tons of Pyrites are annually raised, partly by our Western mines, but chiefly in the county Wicklow.

Magnetic Pyrites, Pyrrhotine, a comparatively rare substance, of a more bronzy colour than the above, contains :—

Iron - - -	60·5	Sulphur - - -	39·5

It is easily distinguishable from the others by attracting the magnetic needle, and is noticeable as frequently yielding a small proportion of cobalt or nickel.

The following species are represented, but are not minerals employed for any economic purpose :—

Vivianite, blue iron (*phosphate of iron*).
Childrenite (*phosphate of iron and alumina*).
Pharmacosiderite, Cube-ore (*arseniate of iron*).

Wall-case 46.

Shelf I.

193. Iron Pyrites, (*bisulphide of iron,*) cubically crystallized, and massive.
Nangiles Mine, Gwennap, Redruth district, Cornwall.
From the Exhibition of 1851.

194. Iron Pyrites, crystallized in large cubes.
Cornwall.

195. Iron Pyrites, the pentagonal dodecahedron, partly imbedded.
Cornwall.
Presented by G. B. Greenough, F.R.S.

196. Iron Pyrites, cubical, but irregularly crystallized.
From Strontian, Argyleshire, Scotland.
Presented by Sir J. M. Riddell, Bart. 1851.

197. Iron Pyrites, crystallized in cubes modified by planes of pentagonal dodecahedron.
Mount Mine, Cornwall.

198. Iron Pyrites, in casts after crystals of Barytes.
Huel Mary Ann, Cornwall.

199. Crystallized mass of Iron Pyrites, on nucleus of Copper Pyrites and Quartz crystals.
Cornwall.

200. IRON PYRITES, massive, with dark Calcspar.
Cae Coch Gwan, Gwydyr Estate, North Wales.

Shelf II.

201. IRON PYRITES, cubically crystallized.
Huel Unity, St. Agnes, Cornwall.

202. IRON PYRITES, in composite forms, crystallized upon vein-quartz.
Cornwall.

203. MARCASITE, (Rhombic or White iron Pyrites), in compound crystals.
Liskeard, Cornwall.

204 & 205. MARCASITE, ("Cockscomb" Pyrites), well crystallized.
Virtuous Lady Mine, near Tavistock, Devonshire.

206. MARCASITE, ("Cockscomb" Pyrites.)
Greyhound Pit, Swansea Valley, South Wales.

207. MARCASITE, crystallized on Quartz.
Nant-y-Creiau, Cardiganshire.
Presented by W. W. Smyth, F.R.S.

207a. MARCASITE, crystallized.
Back of the lead lode, Penrhiw Lead Mine, near Aberystwith, Cardiganshire.

207b. MARCASITE, crystallized.
Weardale, Durham.

208. IRON PYRITES, in globular concretions occurring in a seam of Coal.

Shelf III.

209. IRON PYRITES, with naturally polished surface called "slickensides."
From the side or "wall" of a fault.

210. IRON PYRITES, in small cubes imbedded in Slate rock.
Near Pont Erwyd, between Aberystwith and Rhayader, Cardiganshire.

211. IRON PYRITES, in octohedral crystals.
Weston, near Bath, Somersetshire.
Presented by G. B. Greenough, F.R.S.

212. IRON PYRITES, crystalline, spherical.
Lyme Regis, Dorsetshire.
Presented by G. B. Greenough, F.R.S.

213. IRON PYRITES, a nodule externally crystallized: said to contain gold, and caused much mining excitement in the county (Derbyshire), 1853–4, but on analysis is found to contain no sensible quantity of gold.
Presented by Ph. Hubbersty.

214. Crystal of IRON PYRITES, peculiarly distorted combination of cube and pentagonal dodecahedron.
Percy Main, Newcastle.
Presented by G. B. Greenough, F.R.S.

215. IRON PYRITES, casts on cubes.
From a lead lode, Aldstone, Cumberland.
Presented by G. B. Greenough, F.R.S.

216. IRON PYRITES, detached crystals in cubes, and pentagonal dodecahedrons.
Virtuous Lady Mine, Tavistock, Devonshire.

217. IRON PYRITES, complex crystals strung as a necklace.

217a. IRON PYRITES, irregularly crystallized in cubo-octohedrons.

218. IRON PYRITES, crystallized in nodules.
From the Chalk Marl, Dover Cliff, Kent.
Presented by J. S. Bowerbank.

218a. IRON PYRITES, the mineralizing material of an Ammonite.
Whitby.

219. VIVIANITE, (*Phosphate of iron*), in columnar diverging crystals.
Huel Jane, Kea, Cornwall.

220. VIVIANITE, radiated, on Iron Pyrites.
From the same Mine.

221. Vivianite, crystallized.
Huel Kine, St. Agnes, Cornwall.
Presented by G. B. Greenough, F.R.S.

222. Vivianite, crystallized.
Wheal Betsy, near Tavistock, Devon.

223. Childrenite, (*Hydrated Phosphate of Iron and Alumina*).
George and Charlotte Mine, near Tavistock.

Shelf IV.

224. Mispickel, (*Arsenical Rhombic Iron Pyrites*, or *White Mundic*), consisting of iron, 36; arsenic, 43; sulphur, 21; well crystallized.
Cornwall.

225. Mispickel, well crystallized.
From a Tin lode, Cornwall.

226. Mispickel, massive, with Quartz.
Faithlegg, Co. Waterford, Ireland.

227 & 228. Pharmacosiderite, or Cube Ore, (*Hydrated Arseniate of Iron*), well crystallized.
Redruth, Cornwall.

229. Pyrrhotine, (*Magnetic Iron Pyrites*), massive, with Blende.
Lanivet, near Bodmin, Cornwall.

230 to 232. Pyrrhotine, lamellar, disseminated through Quartz.
Smittergill Head, Cumberland.
Presented by W. W. Smyth, F.R.S.

Shelf V.

233. Large slab of Iron Pyrites, crystallized in cubes with edges replaced by a narrow striated plane.
Cornwall.

233a. Iron Pyrites, crystallized, with Calcite.
Liskeard, Cornwall.

234. Iron Pyrites, large casts after sharp tabular crystals, probably Barytes.
Near Liskeard.

234a. Iron Pyrites, pseudomorphous after crystals of Barytes.
Liskeard.

234b. Iron Pyrites, stalactitic.
Perran Iron Mines, Perranzabuloe, Cornwall.
Presented by M. T. Hitchins.

235 & 236. Iron Pyrites, massive, crystalline, extensively used in the manufacture of sulphuric acid.
Milton, Underhill, Cumberland.
Presented by J. F. Davis.

237. Iron Pyrites, massive, in Anthracite bed called the "Brass "vein."
Raven Inn, Cwm Ammon, Caermarthenshire.

238. Iron Pyrites, in concretionary nodules; contains a little Gold.
From the Kimeridge Clay, Portland Island.
Presented by Her Majesty's Commissioners of Woods, &c.

239. Iron Pyrites, concretionary.
From the London Clay of the Isle of Sheppy.
Presented by G. B. Greenough, F.R.S.

Wall-case 47.

Shelf I.

Magnetite, or Magnetic Iron ore, the natural loadstone, is the richest ore of iron, containing iron 71·68 and oxygen 28·32 per cent. Although very important in Sweden, Norway, and Russia, it is found in but small quantities and in few localities in this country.

240. Magnetite, oxidulated, or Magnetic Iron ore (FeO, Fe^2O^3), massive, granular.
Bodennick, St. Stephen's, Cornwall.
Presented by W. W. Smyth, F.R.S.

241 & 242. Magnetite.
Treluswell, Penryn, Cornwall.
No. 242 presented by W. Lee.

243. Magnetite, crystallized and massive.
Ilsington, Devonshire.
Presented by E. W. White.

244 & 245. MAGNETITE, crystallized and massive.

Ilsington, near Hay Tor, Devon.

Presented by S. H. Blackwell, 1851.

Shelf II.

246. MAGNETITE, minutely crystallized.

Brith-dir uchaf, near Dolgelly, North Wales.

Presented by W. W. Smyth, F.R.S.

247 & 248. MAGNETITE, crystallized in distinct octohedrons and imbedded in Red-oxide of Iron.

Hafodtybach, near Dolgelly.

249 & 250. MAGNETITE, minutely crystalline, or granular, and massive, compact.

Ballycoog, Co. Wicklow, Ireland.

251. MAGNETITE (strongly magnetic, and polar).

Croghan Kinshela, Co. Wicklow.

Presented by W. W. Smyth, F.R.S.

252. MAGNETITE, disseminated through Chloritic Slate.

Morna Mine, near Barracozan, Ireland.

Presented by P. Doran.

253 & 254. MAGNETIC IRON ORE, pisolitic, contains 54 per cent. of metal.

From a bed of great thickness, supposed by some authors to be a dyke, (in the Lias) at Rosedale, the S. W. part of Cleveland, Yorkshire.

(*Vide* Transactions of the North of England Institute of Mining Engineers, 1858.)

WALL-CASE 48.

HÆMATITE, Red Hæmatite, or Red Iron Ore (*anhydrous sesquioxide of iron*). Iron, 70; oxygen, 30. This rich ore, distinguishable from the last by its red streak and the absence of magnetic properties, is obtained in small quantities in Cornwall, Devon, and South Wales, but to an enormous amount, and of the finest quality, in North Lancashire and Cumberland.

The term SPECULAR, from *speculum*, a mirror, is commonly given to the brightly crystallized varieties of this species.

Shelf I.

255. HÆMATITE, massive, compact.

Restormel Royal Iron Mine, Lostwithiel, Cornwall.

Presented by W. W. Smyth, F.R.S.

256. HÆMATITE, delicate fibrous, intermingled with Quartz.

Restormel, Lostwithiel.

257. HÆMATITE, botryoidal and massive,

Lostwithiel.

258. HÆMATITE, ditto.

Brixham, Devonshire.

Presented by J. Price, 1840.

259. HÆMATITE, massive, occurring in irregular masses in Limestone.

Brixham.

Presented by S. H. Blackwell, 1851.

260. Compact MICACEOUS IRON ORE.

Hennock, Devonshire.

Found in lodes varying from 1 to 12 feet wide, bearing E. and W.

The ore is associated with quartz, clay, schorl, and hornblende. It contains 60 per cent. of iron.

Presented by S. H. Blackwell, 1851.

261. HÆMATITE, compact and massive.

Orleigh Court, Bideford, Devonshire.

Shelf II.

262. HÆMATITE, botryoidal, compact.

Said to have been obtained near Ilfracombe, Devonshire. (?)

263. HÆMATITE, brightly coloured, granular and pulverulent.

Porlock, Somersetshire.

264 & 265. HÆMATITIC CONGLOMERATE, in the New Red Sandstone at Porlock and Brockwell.

Near Wotton Courtney, Somersetshire.

266. HÆMATITE, pseudomorphous after Spathose Iron (Siderite).
Cornham Ford lode, Exmoor, Somersetshire.
Presented by F. W. Knight, M.P.

267. HÆMATITE, soft variety termed "Puddling ore."
Hoar Oak, Exmoor.
Presented by F. W. Knight, M.P.

268. HÆMATITE, arenaceous, occurs as a bed from 5 inches to 5 feet thick in the lowest part of the New Red Sandstone series of the locality.
Clapton in Gordano, Portishead, near Bristol.
Presented by S. Stutchbury, F.G.S.

Shelf III.

269. HÆMATITE (Red Iron ore), massive, compact.
Mr. Anthony Hill's Works, Bristol, Somersetshire.

270. HÆMATITE, massive.
Brendon Hills, Somersetshire.
Presented by S. H. Blackwell, 1851.

271 & 272. HÆMATITE, pebbles.
From an alluvial deposit at the foot of Brendon Hill, near Nettlecombe.
Presented by Sir W. C. Trevelyan, Bart.

273. HÆMATITE, a pebble found in an alluvial deposit on the coast.
Near Watchet, Somersetshire.
Presented by Sir W. C. Trevelyan.

274. HÆMATITIC CONGLOMERATE, at the base of the New Red Sandstone,
Frampton Cottrell, Gloucestershire.
Presented by S. H. Blackwell, 1851.

275. Fine HÆMATITIC CONGLOMERATE, in the same deposit.
Newent.

276. HÆMATITE.
From the Greystone Quarries, Bixslade, Forest of Dean, Gloucestershire.

Shelf IV.

277. HÆMATITE, variety *Specular* or *micaceous Iron ore.*
Buckfastleigh, Devon.
Presented by S. H. Blackwell.

277a. MICACEOUS IRON ORE, (crushed and washed).
Amlwch, Anglesey.
Presented by R. Rothwell.

278. MICACEOUS IRON ORE, with films of Malachite.
Cosheen Mine, Co. Cork, Ireland.
Presented by J. D. Croker.

279. HÆMATITE.
Newent Down, Bridgend, Glamorganshire, South Wales.

280. HÆMATITE, mingled with Siderite (Carbonate).
From a vein in the Mountain Limestone, Mumbles, Swansea Bay, South Wales.

281. HÆMATITE.
From the lowest beds of the New Red Sandstone, near Hawarden, Flintshire.

282. HÆMATITE.
From the Lower Coal Measures, Froghall, North Staffordshire.

Shelf V.

283. HÆMATITE, massive, compact.
Ulverstone, Lancashire.
Presented by S. H. Blackwell.

284 to 286. HÆMATITE, reniform and fibrous.
Ronhead Mines, Ulverstone.
Presented by Myles Kennedy.

287. Reniform mass of compact HÆMATITE.
Ulverstone, Lancashire.

288. HÆMATITE, portion of a nodule.
Ulverstone.

289. HÆMATITE, botryoidal and mammillated.
Gatehouse Estate, near Whitehaven, Cumberland.
Presented by G. P. Ley.

290. Hæmatite, massive.
Harrington, near Workington, Cumberland.

Shelf VI.

291 & 292. Portions of largely mammillated Hæmatite, with naturally smooth surfaces of fracture.
Cleator, near Whitehaven.

293. Hæmatite, botryoidal.
Cleator.

294. Hæmatite, botryoidal and crystallized (Specular Iron).
Whitehaven.

295 to 298. Red Iron Ore, crystallized (*specular*), and massive compact Hæmatite.
Cleator.
Presented by S. H. Blackwell.

299. Soft Hæmatite, "Ruddle."
Cleator.

300. Portion of largely mammillated Hæmatite, fibrous.
Ulverstone.

301. Hæmatite, mammillated and reniform.
Ulverstone, Lancashire.

302. Specular Iron, well crystallized with Quartz, coating mammillated Hæmatite. Exceptional occurrence in cavities.
Cleator.

Shelf VII.

303 & 304. Hæmatite, botryoidal.
Ulverstone.

305. Hæmatite, mammillated.
Cleator, near Whitehaven.

306. Hæmatite, massive.
Ulverstone, Lancashire.
Presented by J. Price.

307. Mass of Red Iron Ore.
From a lode in the Mountain Limestone, near Bristol.

Shelf VIII.

308. Red Iron Ore, micaceous and botryoidal.
From a lode in Limestone, near Bristol.

309. Mass of Micaceous Iron Ore, with quartzose matrix.
White Cleave Mine, near Buckfastleigh, Devon.
Presented by Jo. Heath.
Micaceous Iron ore, in crystals so delicately lamellar as to form, on touch, an impalpable powder.

310. Specular Iron Ore, large block.
St. Clether, Cornwall.
Presented by Sir F. C. Knowles, Bart.

Wall-case 49.

Brown Iron Ore; Göthite; Limnite, (*Hydrated sesquioxide,*) sometimes called Brown Hæmatite.

The Sesquioxide of iron with a variable proportion of water in chemical combination. In Göthite, the crystallized and richest species, the iron amounts to 63 per cent., with 10·11 of water.

Shelf I.

311. Brown Iron Ore, fibrous and massive.
Cloughleagh, Ireland.

312 to 314. Brown Iron Ore. (Göthite,) fibrous and botryoidal.
St. Just, Cornwall.

314a. Brown Iron Ore, fine specimen of fibrous "wood iron."
From Trebisken, Perranzabuloe, Cornwall.
Presented by Messrs. Whitford and Carter, 1860.

On the Top Shelf.

315. Brown Iron Ore.
Piran Sands, Perranzabuloe, Cornwall.

315a. Brown Iron Ore, with occasional kernels of Spathose iron (Carbonate).
From the Trevithick lode, Trebisken, Perranzabuloe.
Presented by W. W. Smyth, F.R.S.

316 & 317. Brown Iron Ore, fibrous, radiating.
From a cross course, Bodennick, St. Stephen's, Cornwall.

318. Brown Iron Ore, massive.

From a N. and S. lode, Nantallan Down, Bodmin, Cornwall.

Shelf II.

319 & 320. Brown Iron Ore, massive ; derived from decomposition of Siderite (Spathose iron).

Ladock Iron lode, Cornwall.

321. Brown Iron Ore.

Sheviock, St. Germans, Cornwall.

Presented by S. H. Blackwell, 1851.

322 & 323. Brown Iron Ore, compact.

Brixham, S.W. of Torbay, Devon.

Is found in irregular masses in Limestone ; contains about 55 per cent. of metal.

324 & 325. Brown Iron Ore, earthy, impure.

From an E. and W. lode in porphyritic rock, Hennock, near Chudleigh, Devon.

326. Brown Iron Ore, earthy, occurring in irregular masses in Limestone, (contains about 60 per cent.)

Bishopsteignton, Devon.

327. Brown Iron Ore, forming the cement of a flinty, or semi-opaline breccia.

Orleigh Court, Bideford, Devon.

328. Brown Iron Ore, massive.

Lostwithiel, Cornwall.

Presented by J. Price.

Shelf III.

On this shelf are shown samples of the varieties of this ore of iron, found in the Restormel Royal Iron Mine, Lostwithiel, the property of H.R.H. the Prince of Wales, as Duke of Cornwall.

The remarkable vein worked here by Messrs. J. and R. Taylor, the lessees, is noted for the frequent occurrence of the finest crystallized Göthite hitherto seen in the world.

329 & 330. Brown Iron Ore, botryoidal, mammillated, and fibrous.

331. Göthite, mammillated, with fibrous radiating structure.

332. Göthite, acicularly crystallized, columnar divergent.

333. Göthite, and Red iron ore, in alternating mammillary layers.

From the deep level, Restormel Iron lode.

Presented by W. W. Smyth, F.R.S.

334. Göthite, well crystallized, and partly incrusted with ferruginous Quartz.

335. Göthite, very large crystals, partly incrusted with Quartz.

336. Göthite, mammillated, with microcrystalline surface, and a fibrous structure.

337 & 337a. Variety Wood Iron Ore, botryoidal, with fibrous structure.

338. Successsion of

1. Crystalline Göthite,
2. Fibrous Brown Iron Ore,
3. Quartz,

Upon soft Red Iron Ore.

339. Brown Iron Ore, yellowish, massive, intermingled with much Quartz.

Shelf IV.

340 to 342. Brown Iron Ore, massive, compact.

Wrington Hill, Somersetshire.

Presented with the five following specimens (from the same locality) by Mrs. Aveline.

343. Brown Iron Ore, intermingled with red ferruginous Quartz.

344. Brown Iron Ore, with Red Hæmatite.

From a lode traversing Limestone, Outlands, Wrington.

345. Brown Iron Ore, cavernous, coated with Red Ochre.

346. Brown Iron Ore, stalactitic, with Quartz crystals.

347. Brown Iron Ore, mammillated.
Haydon Farm, Mendip Hills.

348. Brown Iron Ore, massive, compact.
Brendon Hill, near Nettlecombe, Somerset.
Presented by Sir W. C. Trevelyan, Bart.

349. Brown Iron Ore, stalactitic.
From back of lode at Hangley Cleve, Exmoor, Somerset.
Presented by F. W. Knight, M.P.

350. Göthite, compact.
From Hoar Oak.
Presented by F. W. Knight, M.P.

351. Göthite, compact, and pseudomorphous after Siderite.
From Deer Park, Exmoor.
Presented by F. W. Knight, M.P.

Shelf V.

352 & 353. Göthite, cavernous, with Calcite crystallized inside; in stalactitic and hemispherical forms with a fibrous stellated structure.
Occurs imbedded in the Magnesian Conglomerate at Clapton in Gordano, Portishead.
Presented by S. Stutchbury, F.G.S.

354. Brown Iron Ore, variety Wood Iron, a rolled pebble.
St. Phillips, Bristol.
Presented by Mrs. Aveline.

355. Brown Iron Ochre.
From a 10 feet seam, Anna Maria Mine, Barmouth, Merionethshire.
Presented by S. T. Jones.

355a. Iron Ochre.
Bleaugwinlais, Caerphilly, Glamorganshire.
Presented by W. Thomas.

356. Black Pisolitic Iron Ore.
Bettws Garmon, Llanberis, Caernarvonshire.

357. Black Pisolitic Iron Ore.
Llanginian, near Pwllheli, Caernarvonshire.

358 to 360. Pisolitic Iron Ore.
Tremadoc, Caernarvonshire; occurs in large masses in the older rocks.
Presented by S. H. Blackwell, 1851.

361. Pisolitic Iron Ore.
West of Telegraph Station, Llanfairynghornwy, Anglesey.

362. Pisolitic Iron Ore.
Melin Esgob, N.E. of Llanerchymedd, Anglesey.

Shelf VI.

Ores from the Forest of Dean. Presented mostly by H.M. Commissioners of Woods and Forests.

363. Brown Iron Ore, very compact, "Sandstone ore."
From the Millstone Grit, Eastern side of the Forest.

364 & 365. Brown Iron Ore, intermingled with Siderite (*carbonate*), locally called "Grey ore."
From the Mountain Limestone.

366 to 369. Brown Iron Ore, provincially called "Blackbrush."
From the joints of the graystone quarries, above the Coleford High Delf Coal, Bixslade, Dean Forest.

370. Brown Iron Ore, small, loose, provincially called "Smith Ore."
Found in irregular hollows and huge caverns, called "churns," in the Limestone.

371. Brown Iron Ore, cellular, or tubiporous variety.
Easter Mine.
Presented by S. H. Blackwell.

372. Brown and Red Oxides of Iron, massive.

373. Brown Iron Ore, pseudomorphous after Iron Pyrites.
Pentyrch, near Cardiff, Glamorganshire.
Presented by T. W. Booker.

374. Brown Iron Ore, massive and stalactitic.
Pentyrch.

375. Brown and Red Iron Ore, with Quartz.
Pentyrch.

Shelf VII.

376. Brown Iron Ore, with Manganese.
From the Carb. Limestone, Foxfold, Melmerby Scar, Cumberland.
Presented by W. W. Smyth, F.R.S.

377. Brown Iron Ore, with Quartz pseudomorphous after Barytes.
From the same locality.

378. Brown Iron Ore, earthy.
North Crossfell, Cumberland.
Presented by W. W. Smyth, F.R.S.

379. Brown Iron Ore.
From a bed 3 to 7 feet thick, of good quality, Kilhope Fell, near Nent Head, Cumberland.
Presented with many of the following by S. H. Blackwell, 1851, all of them being from the mountain or carboniferous limestone.

380 & 381. Brown Iron Ore.
From a bed about 7 feet thick, quality very variable, Nent Head.

382. Brown Iron Ore.
Silly-hole vein.

383. Brown Iron Ore.
Manor House vein.

384. Brown Iron Ore.
Nest vein, Aldstone.

385. Brown Iron Ore.
Stanhope, Durham.

386. Brown Iron Ore.
St. John's Chapel, near Stanhope.

Shelf VIII.

The following group of ores from the Lias and Oolitic formations are brown iron ores only where they have been exposed to the action of the air and of water. When followed downwards from the surface they are seen in their original condition of carbonates, mingled less frequently with silicate.

387 & 388. Brown Iron Ore, nodular.
From the Lias, Eston Hill, near Redcar, Yorkshire.
Presented by W. W. Smyth, F.R.S.

389. Ironstone, greenish, with fossil (Pecten æquivalvis).
Whitby, Yorkshire.
Presented by J. Cowper, of Aldstone.

390. Ironstone (contains many fossils).
From the Lias, Whitby.
Presented by S. H. Blackwell.

391. Ironstone, with fossils.
From the Lias, Ayton, Cleveland, Yorkshire.
Presented by H. L. Thornhill.

392 & 393. Ironstone, with organic impressions.
From the Lias of Christchurch, near the Tees, Yorkshire.

394. Iron Ore.
Cleveland District, Yorkshire.
Presented by W. W. Smyth, F.R.S.

395. Brown Iron Ore, (? calcareous) in irregular crusts.
South Woods, Thirsk, N. Riding, Yorkshire.

Shelf IX.

396. Brown Iron Ore, earthy.
Rushton, Northamptonshire.

397 to 399. Brown Iron Ore, in rich crusts in a bed about 4 feet thick, in the Oolites.
From Chapel Brompton, and Nobottle, Spencer House, Northamptonshire, 1851.

400. Brown Iron Ore, with nucleus of earthy carbonate.
Newport Pagnel.
Presented by C. Twamley, F.G.S.

401. Brown Iron Ore.

402. Iron Ore, arenaceous.
From a bed 2 to 3 feet thick, in the Lias of Saxelby, Lincolnshire.
Presented by S. H. Blackwell.

403. Brown Iron Ore, with vegetable remains.
Gwydyr Estate, North Wales.

404. Limonite, or Bog Iron ore.
Scotland.

Wall-case 50.

Spathose or Sparry Iron Ore, Chalybite, Siderite, or Brown Spar (*Carbonate of iron*), termed by some of our metallic miners "White Iron," contains protoxide of iron, 62·07; carbonic acid, 37·93, but generally has a proportion of the oxide of iron replaced by manganese, lime, or magnesia.

Shelf I.

405. Spathose Iron Ore, massive, crystalline.
Trewalder Mine, Camelford, Cornwall.
Presented by Sir F. C. Knowles, Bart.

406 & 407. Spathose Iron, massive, crystalline, associated with Galena.
From the lead lode, Huel Betsy, Tavistock, Devonshire.

408 & 409. Spathose Iron, massive, largely crystalline.
Huel Eliza, Exmoor, Somersetshire.

410 & 411. Spathose Iron, massive, crystalline.
Gupworthy, near Brendon Hill, Somerset.

412. Spathose Iron, with Quartz.
From a vein in Devonian Slate, Gupworthy, Somersetshire.

Shelf II.

413. Spathose Iron, crystalline.
From Felspathic rocks, near Porth Dinorwig, Caernarvonshire, North Wales.

414. Spathose Iron, crystallized and massive.
Stanhope, Weardale, Durham.

415. Spathose Iron, crystallized and massive.
From a lead lode, Helston, Cornwall.

416. Spathose Iron, massive.
From the "flats" in the Great Limestone, Allenheads, Northumberland.
Presented by W. W. Smyth, F.R.S.

417 & 418. Spathose Iron, massive, crystalline.
"Rider" of lead veins, Middlehope Mine, Weardale, Durham.
Presented by W. W. Smyth, F.R.S.

418a. Spathose Iron Ore.
Weardale, Durham.
Presented by Joshua Bates.

419. Spathose Iron.
From the great lode in Glendalough, appearing on the South side of the Waterfall, Co. Wicklow, Ireland.

420. Carbonates of Iron, Magnesia, and Lime.
Bantry Bay, Ireland.

Shelf III.

421. Spathose Iron, crystallized.
Lostwithiel, Cornwall.

422. Spathose Iron, in nail-shaped crystals.
Fowey Consols, St. Blazey, Cornwall.

423. Spathose Iron, crystallized in very obtuse rhombohedrons, upon Quartz.
Pengilly Mine, Cornwall.
Presented by P. N. Johnson, F.R.S.

424. Spathose Iron, fibrous.
Cornwall.

425 & 426. Spathose Iron, crystallized on Copper Pyrites and Quartz.
Virtuous Lady Mine, near Tavistock, Devon.

427. Spathose Iron, partly coated with iridescent Copper Pyrites, upon white Quartz.
Near Tavistock.

428. Spathose Iron, crystallized in spherical groups, on the sides of fissures of contraction, in a Clayball-ironstone.
Dudley, Worcestershire.

Shelf IV.

Black-band Ironstone, (*impure carbonate of iron*), with

coaly matter, occurring as a thin band interstratified in the Coal Measures. Contains sufficient carbonaceous matter to calcine itself, and thus produces, at little expense, from a poor stone a rich iron ore.

429 to 431. Black-band.
Upper and lower divisions of the bed at Cambrian Works, South Wales.
Presented by Dr. Bowring.

432 to 434. Black-band.
From the Coal Measures at Cwm Rhondda fach, Glamorganshire.
Presented by Captain Basset Saunderson.

435. Black-band (top stone, 12 inches thick).
Beaufort Iron Works, near Pontypool, Monmouthshire.
Presented by C. Barley.

436. Black-band (middle stone, 30 inches thick).
Beaufort Iron Works.

437. Black-band (bottom stone, 4 inches thick).
Beaufort Iron Works.

Shelf V.

Argillaceous, or Clay-Ironstone, (*impure earthy carbonate of iron*) occurring in concretionary nodules and thin beds or bands, chiefly in the Coal Measures.

438 & 439. Argillaceous Ironstone.
Occurring in nodules in the Devonian Slates, Exmoor, Devonshire.
Presented by W. W. Smyth, F.R.S.

Clay Ironstones of the Coal Measures.

There are few parts of our British coal-fields which do not contain this variety of iron ore. Spread out in sheets of from an inch to three or four inches thick, with shales or "binds" above and below, or dispersed in nodules or "balls" even more variable as to size, and imbedded in shales or indurated clays, they form the great staple material of our iron trade. In each locality the particular beds, very numerous as they sometimes are, are known by special names; and with the name certain characters will sometimes be found to remain persistent over an area of miles in extent. But, comparing different tracts, these ores are subject to great variations, and the chief wealth of the measures may lie in the lower part in one district, in the upper part in another. Their value will depend locally on the number and thickness of the successive bands within a given height of shaly strata, upon the kind of material with which they are associated, and upon the comparative richness or poverty, *leanness*, in iron, of the individual beds.

The average varieties of this ore employed in smelting, contain from 25 to 35 per cent. of metallic iron. The metal exists in them in the form of a carbonate of protoxide, mingled with numerous other substances, among which may be specified silica, magnesia, lime, manganese, phosphoric acid, and organic matter.

The clay iron ores are arranged in the cases geographically, beginning with the coal-field of South Wales, and thence passing from the south-west to the north-east. From each special district or mine they are placed as nearly as possible in the order in which they occur in nature. Fuller particulars than can properly be given in a catalogue, will be found in the "Iron Ores of Great Britain," and in the Sections of the Geological Survey.

Shelves 5 and 6 exhibit a number of specimens to illustrate the various shapes which such nodules present, and some of the extraneous minerals which are sometimes found to crystallize in the hollows formed in their interior.

440. Portion of a nodule of ARGILLACEOUS IRONSTONE, with Millerite (*Sulphide of Nickel*) acicularly crystallized on quartz, in the cracks.
Merthyr Tydfil.

441 to 445. Nodules of ARGILLACEOUS IRONSTONE.
From Merthyr Tydfil, Glamorganshire.

446 & 446a. Nodules of ARGILLACEOUS IRONSTONE called "Penny pieces."
South Wales.

447 & 447a. Nodules of ARGILLACEOUS IRONSTONE, from an "underclay."
Aberdare, Glamorganshire.

Shelf VI.

448 & 448a. Nodules of ARGILLACEOUS IRONSTONE.
Ystradgunlas, Brecknockshire.

449. Nodule of ARGILLACEOUS IRONSTONE.
From the Coal Measure Shales, South Wales.

450. Nodule of ARGILLACEOUS IRONSTONE.

451 & 451a. Nodule of ARGILLACEOUS IRONSTONE, broken open to show its concentrically coated structure.
Merthyr Tydfil.

452. Septarian nodule of ARGILLACEOUS IRONSTONE, exhibiting the fissures extending to the surface.
Maesteg, Glamorganshire.

453. Nodule of ARGILLACEOUS IRONSTONE, containing *Stigmaria ficoides*, the root of the fossil plant *Sigillaria*.
From an underclay of the Coal Measures at Maesteg Iron Works, Bridgend, Glamorganshire.
Presented by Mr. Bicheno.

454. ARGILLACEOUS IRONSTONE, with organic remains, probably worm tracks.
Coal Measures, South Wales.

454a. ARGILLACEOUS IRONSTONE, with organic remains.
Coal Measures, Staffordshire.

Shelf VII.

455. ARGILLACEOUS IRONSTONE.
From the Coal Measures at Blackwell, Somerset.

ARGILLACEOUS IRONSTONES, from the *South Wales Coal-field*. Mostly presented by S. H. Blackwell, 1851.

South Wales.—*Eastern Outcrop.**

Series from *Blaenavon, Monmouthshire :—*

456. Bed called "Black Pins."

457. "Three-quarter Balls," with Calcite crystallized in the cracks.

458. "Meadow Vein Mine," or "Pwllaca."

459. "Spotted Vein."

460. "Bottom Vein Mine."

* See for illustration the Section of the Measures at Ebbw Vale, in the "Iron Ores of Great Britain," p. 172, and the Vertical Sections of the Geological Survey, Sheet 8.

Shelf VIII.

Series from *Pontypool* :—

461. "Black Pin Vein."

462. "Rock Vein Pin."

463. "Meadow Vein Pin," or "Pwllaca."

464. "Red Vein Pin."

Shelf IX.

Pontypool—continued :—

465. "Droidic Ball."

466. "Rock Pin."

467. "Spotted Vein," pin.

468. "Spotted Vein," ball.

Nos. 461 to 468 presented by D. H. Williams.

Wall-case 51.

Shelf I.

South Wales.—*North-eastern Outcrop.*

Series from *Coalbrook Vale* :—

469. "Soap Vein" { Top course.
470. "Soap Vein" { Middle.
471. "Soap Vein" { Bottom course.

472 & 473. "Black band."

474 to 477. "Black Pins."

Shelf II.

Coalbrook Vale—continued :—

478. "Grey Vein."

479. "Three-quarter Balls."

480. "Three-quarter Vein."

481 & 482. "Black Band."
Nant-y-glo.

483 & 484. "Spotted Pin."

485 & 486. "Little Pins."
Nant-y-glo.

487. "Red Vein" (bottom measure).

488. "Big Vein."
Nant-y-glo.

Shelf III.

South Wales.—*Northern Outcrop.*

Series from *Dowlais, Cyfartha,* and *Penydarren* :—*

489. "Top Vein" (upper measures).
Penydarren, near Merthyr Tydfil, Glamorganshire.
Presented by D. H. Williams.

490. "Black Band" of the Gwrid or Gwr-hyd mine.

491. "Gwrid Mine."
Dowlais.

492. "Soap Vein" (top course).
Dowlais.

493. "Soap Vein" (middle pin).
Penydarren.

494 & 494a. Nodules in the Soap Vein.
Cyfartha, Merthyr Tydfil.

Shelf IV.

Dowlais, Cyfartha, and *Penydarren*—continued :—

495. "Old Soap Vein."
Cyfartha.
Nos. 493 to 495 presented by D. H. Williams.

496. "Soap Vein" (bottom course).
Dowlais.

497. "Black Pin."
Penydarren, Merthyr Tydfil.

498. "Black Vein."
Cyfartha.

499. "Pin above the Balls."
Cyfartha.

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* See for detailed Section the "Iron Ores of Great Britain," p. 200.

500. "Balls with the Fire-clay."
Cyfartha.

501. "Balls under the Fire clay."
Cyfartha.

502. "Big Vein," belonging to the "Nobby."
Cyfartha.

Shelf V.

Dowlais, Cyfartha, and *Penydarren*—continued :—

503. Pin of "Big Vein," of Canapog or Enapog.
Cyfartha.

504. "Big Vein" of Canapog.
Cyfartha.

505. "Lower Black Pin."
Merthyr Tydfil.

506. "Lower Black Vein."
Merthyr Tydfil.

507. "Black Pin" (lower measure).
Penydarren.
Nos. 497 to 507 presented by D. H. Williams.

508 & 509. "Black Pin Soap Vein."
Dowlais.

Shelf VI.

Dowlais, Cyfartha, and *Penydarren*—continued :—

510. "Pin under the Soap Vein."
Cyfartha.
Presented by D. H. Williams.

511. "Brass Vein Mine."
Dowlais.

512. "Little Vein."
Merthyr Tydfil.
Presented by D. H. Williams.

513. "Little Pins."
Dowlais.

514. "Big Blue Vein."
Dowlais.

515. The "Blue Vein."
Cyfartha.

Shelf VII.

Dowlais, Cyfartha, and *Penydarren*—continued :—

516. "Canapog Vein."
Cyfartha.
Nos. 515 & 516 presented by D. H Williams.

517. Balls under the nine feet Coal.
Cyfartha.

518. "Rider's Pin" (sometimes called "Spotted Pin" at Dowlais).
Penydarren.

519. "Spotted Vein."
Dowlais.

520. "Yellow Vein."
Penydarren, Merthyr Tydfil.

521 & 522. "Red Vein."
Dowlais.

523 & 524. "Little Blue Vein.
Dowlais.

Shelf VIII.

Dowlais and *Cyfartha*—continued :—

525. "Black Pin of the Little Blues."
Cyfartha.

526. "The Penydarren Red Vein" ("Blue Vein" of Dowlais).
Merthyr Tydfil.

527 & 528. "Jenkin Pins."
Dowlais.

529 & 530. "Lumpy Vein."
Dowlais.

531. "Rough Vein."
Cyfartha.

Wall-case 52.

Shelf I.

Series from *Merthyr Tydfil*:—

532. "Rough Pin" or "Pin Garrw."

533. The "Rosser Vein.

534. "Henry's Pin."

535. "Stone Vein."

536. "Upper Jack Vein."

537. "Penydarren Jack Vein."

Shelf II.

South Wales.—*Central Anticlinal District.*

Series from *Cwm Avon*: *—

538. "Black Band."
Cwm Avon (or Afon) Glamorganshire.

539. "Big Mine."

540. "Middle Big Mine."

541. "Balling Mine" (large course).

542. "Balling Mine" (small course).

Shelf III.

Cwm Avon—continued :—

543. "Sulphury Mine" (top course).

544. "Sulphury Mine" (middle course).

545. "Sulphury Mine" (bottom course).

546. "Cefn glo Balls."

547. "Middle Clay Vein."

548. "Five Feet Pin" (top course).

549. "Five Feet Pin" (bottom course).

550. "Jack Mine."

551. CLAY IRONSTONE from the bed considered to be the best in the ground worked for the furnaces at *Maesteg Iron Works, Glamorganshire.*
Presented by D. Smith.

Shelf IV.

South Wales.—*Western or Anthracitic District.*

Series from *Ystalyfera, near Swansea* :—

552 & 553. "Black Band."

554 & 555. "Black Pins."

556. "Soap Vein."

Shelf V.

Ystalyfera—continued :—

557 & 557a. "Penny-pieces."

558 & 559. "White Pins" (sometimes called "Coedfalda Mine").

560. "Black Vein Mine."

WALL-CASE 53.

Shelves I. & II.

Ystalyfera—continued :—

561 to 568. "Little Vein Mine."
Ten courses in 18 feet ground. Yields 7,000 tons per acre. This is the most important measure of ironstone in this district.

569. Argillaceous Ironstone, near the bed called "Sturdy Vein."
In the cracks of this ironstone brown spar and quartz often occur.

Shelf III.

Ystalyfera—continued :—

570. "Billets."

571. "Harnlo Mine."

572 to 574. "Brass Vein."

575. Argillaceous Ironstone, the cracks of which are filled with Iron Pyrites.

576. "Little Brass Mine."
Ynis Cedwin.

577 & 578. "Cwm-Fil Mine."
Ynis Cedwin.

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* See Vertical Section of Geological Survey, Sheet 3.

Shelf IV.

579. Argillaceous Ironstone.
Cwm Fil, Ystradgunlas, Brecknockshire.

580. The "Upper Vein."
Ystradgunlas, Swansea Valley, Brecknockshire.

581. Thick portion of the "Little Vein."
Ystradgunlas.

582. The "Blue Vein."
From the Coal Measures near Ystradgunlas.
The form of this specimen is produced naturally by cleavage planes.

583. The "Yellow Vein."
Ystradgunlas.

584. Band or course with the "Yellow Vein."
Ystradgunlas.

585. Argillaceous Iron Ore.
Above the six feet coal, near Raven Inn, Cwm Ammon, Caermarthenshire.

586. Argillaceous Ironstone.
Trimsarren, Pembre, Caermarthenshire.

Shelf V.

587. A nodule of Clay Ironstone.
From the lower Coal Measures at Rhyd y Dafid, near Swansea, Glamorganshire.

588. Argillaceous Ironstone,
From one of the courses at Rhyd y Dafid.

A series of CLAY IRONSTONES, from *Saundersfoot, Pembroke* :—

589. Pin of "Rock Vein."

590 & 591. Balls of "Rock Vein."

592. "Low Vein" balls.

593. "Timber Vein Mine."

Shelf VI.

Saundersfoot—continued :—

594. "Big Balls."

595. "Lower Pin."

596. "Irregular Vein."

597. "Double Pin."

598 & 599. "Dunstone Balls."

600. "The Vein."

601. "Balls."

602. "Jack Vein."

603. "A Vein."

604. "Timber Vein Mine."

Shelf VII.

Saundersfoot—continued :—

605 to 613. Stokes speculation pit; vein and balls.

614. "Stinking Vein," balls.

Shelf VIII.

615. Argillaceous Ironstone, part of a considerable lode traversing Carboniferous Limestone.
Bishopston, Gower, Glamorganshire.

Series from *Aberpergwm, Cwm Neath, Glamorganshire* :—

616. The "Soapy Vein."

617. "Clodding" or "Scouring Vein."

618. "Balls" upon the nine feet coal.

619. "Reed" or "Rhyd Vein."
Cwm Gwrach, Cwm Neath.

620. "Jack" riding the "Black Vein," showing semi-crystallized structure called "cone-in-cone."
Cwm Gwrach, Cwm Neath.

Shelf IX.

Aberpergwm—continued :—

621. "Scouring" or "Black Vein."

622. "Pin Maen" of the "Black Vein."

623 & 624. "Vein" under the three feet bed of coal.
Cwm Gwrach, Cwm Neath.

625. The "Enoch Vein."

626. The "Blue Vein."

627. "Big Vein" or "Pin Mawr."

628. The lowest bed of Ironstone,
In the vicinity of Pyle, Glamorganshire, 1839.
Nos. 627 & 628 presented by the late Sir H. T. De la Beche.

WALL-CASE 54.

Shelf I.

South Wales.—*Southern Outcrop.*

Series from *Cefn Cwse :—*

629. "Six feet Ironstone."

630. "Nine feet Balls."

631 & 632. "Fiery Vein Ironstone."

633. "Upper Spotted Vein."

634. "Variegated Pins."

635. "Yellow Vein."

636. "Upper Red Vein."

637. "Upper Red Vein Balls."

638. "Lower Red Vein."

639. "Black Pins."

640. "Lumpy Balls."

641. "Pin Garw Balls."

Shelf II.

North Wales.

Series from *Rhuabon, Denbighshire :—*

642 to 644. "Upper Yard Ironstone."

645 & 646. "Red Coal Ironstone Balls."

647 to 650. "Stone Coal Ironstone" (4 courses).

Shelf III.

651. "Lower Yard Coal Ironstone."

652 to 657. "Wall and Bench Ironstones" (6 courses).

Shelves IV. and V.

658 to 672. "Llwynemion Ironstones" (15 courses).

Shropshire.

Shelf VI.

673. ARGILLACEOUS IRONSTONE, bed called "Pennystone," enclosing fossil wood.
Madeley.

Series from *Donnington Wood:—*

674. "Chance Pennystone."

675 & 676. "Blackstone."

677 & 678. "Brick Measure."

679 & 680. "Ballstone."

681. "Yellowstone."

682 & 683. "Blue Flats."

684. "White Flats."

685. "Main Pennystone."

686 & 687. "Main Pennystone."
Madeley Court.

688. Crawstone.
Madeley Wood.

689. Black Plats, locality uncertain.

South Staffordshire.—*Dudley District.*

Shelf VII.

Series from *Dudley :—*

690. "Brooch Ironstone" (top measure).

691. "Brooch Ironstone" (bottom measure).

692 & 693. "Pins Ironstone."

694 & 695. "Penny Earth Ironstone."

Shelf VIII.

Dudley—continued :—

696 & 697. "Grains Ironstone."

698. "Gubbin Ironstone" (the Gubbin).

699. "Gubbin Ironstone" (Cannock).

700. "Gubbin Ironstone" (Rubble).

701. "Gubbin Ironstone" (Brownstone).

Shelf IX.

Dudley—continued :—

702 & 703. "White Ironstone Binds."

704 & 705. "White Ironstone."

706 & 707. "White Ironstone."
Brockmoor.

708 & 708a. "Cone-in-cone" (ferriferous shale, not used as an ore of iron, but in making cement), occurring in the "White Stone" or "New Mine," which lies below the "ten yard coal."
West Bromwich, Staffordshire.
Presented by J. S. Davies.

Wall-case 55.

Shelf I.

709 to 712. "Cakes" or "Blue Stones."
Dudley.

713 to 715. "Fire clay balls."
Dudley.

South Staffordshire.—*Wolverhampton District.*

Shelf II.

716. Argillaceous Ironstone, with Blende crystallized in the cracks.
Wolverhampton, 1839.

717. Bed called "Blackband," a very dark clay stone.
Wolverhampton, 1839.

718 & 719. "Poor Robins."
Bunker's Hill.

720. "Fire clay balls."
Wolverhampton, 1839.

721. "Rough Hill White" (top measure).
Darlaston.

Shelf III.

722. "Gubbin and Balls."
Bunker's Hill.

723. "The Gubbin."
Wolverhampton, 1839.

724. "Ball of Gubbin Ironstone."
Bunker's Hill.

725. "White Stone."
Wolverhampton, 1839.

726. "Blue Flats" (top measure).
Bunker's Hill.

727. "Blue Flats" (chance stone).
Bunker's Hill.

728. "Blue Flats," containing numerous fossil shells.
Wolverhampton, 1839.

729 & 730. "Bristol diamonds."
Darlaston.

Bentley and Birch Hills District.

Shelf IV.

731 & 732. "Brown Stone."
Bloxwich.
This is the only measure of Blackband in the South Staffordshire coal-field.
The other measures of this district do not vary greatly from those of Wolverhampton.

Warwickshire.

732 a. Argillaceous Ironstone, found in nodules from 1 lb. to 10 cwt., 10 feet below the coal.
Wyken Colliery.

732 b. Argillaceous Ironstone. Seam about 6 inches thick, 10 feet below the coal.
Wyken Colliery.

732 c. Argillaceous Ironstone, 3 feet 6 inches thick, 114 yards deep.
Victoria Colliery.

732 d. Black Ironstone, 4 feet thick, 170 yards deep.
Victoria Colliery.

Nos. 732 a to d presented by Messrs. Woodhouse and Jeffcock.

North Staffordshire.

Shelf V.

The ironstones of this and the following series taken from different portions of the "Potteries" coal-field are especially rich and abundant. They present also a subject of particular interest to the geologist in the numerous remains of fishes as well as of mollusca preserved in the shales which accompany them. The strata containing them are nearly 1,200 feet in thickness.*

A series from *Foley Colliery, Longton* :—

733. "Bassey Mine."
734. "Deep Mine."
735. "Chalky Mine."
736. "New Mine."
737. "Hanbury Mine."
738. "Knowles' Mine."
739. "Little Mine."

Shelf VI.

A series from *Shelton Colliery, Hanley* :—

740. "Red Shag Ironstone."
741. "Gutter Mine."
742. "Bassey Mine."
743. "Penny Stone."
744. "Deep Mine."
745. "Chalky Mine."
746. "Gubbin Stone."
747. "Billy Ironstone," reposing immediately on a coal seam, and containing sharp angular fragments of coal, pieces of plants, and unios, with crystals of blende in the cracks.

A series from *Apedale, near Newcastle-under-Lyne* :—

748. "Blackband" Ironstone.
749. "Red Shag."
750. "Red Mine."
751. "Bassey Mine."

Shelf VII.

Apedale—continued :—

752. "Cannel Mine."
753. "Chalky Mine."
754. "Brown Mine."
755. "Gubbin Stone."
756. "Deep Mine."

Yorkshire.—*Northern District.*

757 & 758. Argillaceous Ironstone.
From the Lias formation of Whitby Yorkshire.

Shelf VIII.

The "White-bed Mine," *Brierley* :—

759. Top Flats.
760. Low Flats.
761. White Balls.
762. Middle Balls.
763. Low measure.

The "Black-bed Mine," *Low Moor* :—

764. Top Balls.
765. Flat Stone.
766. Middle Balls.
767. Rough Measure.
768. Low measure.
769. Basset Stone.

* See Mr. Salter's palæontological notes. Iron Ores of Great Britain, p. 292.

Shelf IX.

Yorkshire.—*Southern District.*

The "Swallow Wood Mine," *Milton*:—

770. Flats.

771. Bottom Measure.

771a. "Lidgate White Bed."
Elsecar Iron Works.
Presented by Messrs. Woodhouse and Jeffcock.

The "Tankersley Mine," *Milton*:—

772. Middles.

773. Bottom Measure.

773a. "Tankersley New Mine."
Strafford Colliery.
Presented by Messrs. Woodhouse and Jeffcock.

The "Thorncliffe" or "Old Black Mine," *Parkgate*:—

774. Balls.

775. Holing Measure.

Wall-case 56.

Shelf I.

The "Thorncliffe White Mine," *Parkgate*:—

776. Flats.

777. Balls.

The "Clay Wood" or "Black Mine," *Parkgate*:—

778. Balls.

779. Whetstone.

780. Argillaceous Ironstone, A. (with bivalve shells, unios, &c.), called the "Black" or "Mussel-band."

781 to 783. Argillaceous Ironstone, B.

784 to 786. Argillaceous Ironstone, C.
Nos. 780 to 786 from the Elsecar Iron Works, near Rotherham, Yorkshire.
Presented by J. Harlop.

Of these A. is the best ore, used in the proportion of 9 to 1·5 of the ore B. to make "fluid iron," and 9 to 2·5 of the ore C. to make "strong iron."

Shelf II.

Derbyshire.

Many of the following ironstones contain bivalve shells, chiefly *Anthracosia* (*Cardinia*) *bipennis*.

"Measure and Balls Rake" *Staveley*:—

787. Whetstone.

788. Flampards.

789. Cub.

790. First Balls.

791. Flat Balls.

792. Bottom Measure.

793 & 794. "Swallow Wood Rake."
Stanton.

The "Tan Yard" or "Pender Park Rake," *Staveley*:—

795. Red Measure.

796. Balls.

797. Cockle.

The "Buff" or "Cement Rake," *Alfreton*:—

798. Top Measure.

799. Balls.

800. Bottom Measure.

Shelf III.

The "Brown Rake," *Butterley*:—

801. Balls.

802. Top Measure.

803. Bottom Measure.

The "Black Rake," *Butterley*:—

804. Top Measure.

805. Bottom Measure.

806. Poor Rake.
Alfreton.

807. "Blue Rake."
Butterley.

807a. "Blue Rake" (ball measure), 160 yards deep.
Oakerthorpe Colliery.
Presented by Messrs. Woodhouse and Jeffcock.

808. "Spring" or "Ridings Rake."
Alfreton.

Shelf IV.

809. "Dog-tooth" Ironstone.
Codnor Park.

809a. "Dog-tooth" or "Three-quarter Ironstone" (top or ball measure), 35 yards deep.
Oakerthorpe Colliery.
Presented by Messrs. Woodhouse and Jeffcock.

The "Dog-tooth Rake," *Staveley:*—

810. White Measure.

811. Sugar-plum Measure.

812. Marble Measure, containing many fossils.

813. Balls.

814. Snail horn.

814a. Dog-tooth (bottom measure), 4 inches thick, 35 yards deep.
Oakerthorpe Colliery.
Presented by Messrs. Woodhouse and Jeffcock.

815. "Dog-tooth Ironstone," containing fossil shells (*Anthracosia*) in extraordinary numbers.
Unston.

816. "Brown Measure."
Clay Cross.

817. "Nodule Rake" (cinder measure).
Morley Park.

818. "Nodule Rake" (balls).
Morley Park.

819. "Three-quarter Balls."
Clay Cross.

Shelf V.

The "Black Shale Rake:"—

820. Whetstone.
Staveley.

821. Chitter.
Staveley.

822. Cheeses.
Staveley.

823. Cheese Ironstone, with Galena, Blende, and Siderite filling up the cavities.
Hady, near Chesterfield.

824. Bear Stone Capping, an argillaceous shale with "cone-in-cone structure."
Hady.

825. Bear.
Staveley.

826. Top Blues.
Staveley.

827. Lower Blues.
Staveley.

828. Old Man.
Staveley.

829. Old Man, with Copper and Iron Pyrites, Blende, and Siderite crystallized in the cracks.
Hady, Chesterfield.

830. Old Woman.
Staveley.

831. Smooth Chitter.
Staveley.

832. White Balls.
Staveley.

Shelf VI.

Black Shale Rake—continued:—

833. Flampards.
Staveley.

834. Red Measure.
Staveley.

835. Dun Lining.
Hady.

836. Dun.
Staveley.

837. Over Lumps.
Hady.

838. Beams.
Staveley.

839. Nether Lumps.
Hady.

840. Roof Measure.
Staveley.

841. Bottom Measure.
Staveley.

842 to 844. "Striped Rake."
Kirk Hallam.

845. "Green Close Rake."
Morley Park.

846. "Holly Close Rake."
Morley Park.

847 to 852. "Black or Ketland's Rake."
Morley Park.

Shelf VII.

853 & 854. "Bacon-flitch Rake."
Alfreton.

855. "Yew-tree Rake."
Morley Park.

The "Honey-croft Rake," *Stanton :—*

856. Chitters.

857. Tufty Balls.

858. Barren Beet.

859. Grindstone Measure.

860. Grinder's Wife.

861. Big Balls.

862. Bottom Flats.

863. Brick Measure.

Shelf VIII.

The "Civilly Rake," *Stanton :—*

864 Ratchell Measure.

865. Chance Balls.

866. Bottom Measure.

867. Chitters.

868. Coal Measure.

The "Dale Moor Rake," *Stanton :—*

869. Clunch Balls.

870. Roof Measure Balls.

871. Roof Measure.

872. Over Bottoms.

873. Bottom Balls.

This lowest worked measure of the Derbyshire coal-field is remarkable for frequently containing well preserved specimens of fishes, of the genera Palæoniscus, Platysomus, &c.

Shelf IX.

Northern Counties.

874. Nodule of Argillaceous Ironstone.
From Swalhope, Northumberland.
Presented by Sir W. Trevelyan, Bart., 1859.

875. "Black Band," with fossil shells.
Hadley, Northumberland.

876 & 877. "Black band."
Haydon Bridge, Northumberland.

878 & 879. "Ballstone."
Haltwhistle, Northumberland.

880 & 881. "Ballstone."
Nent Head, Cumberland.

882. "Ballstone," from the lower coal measures.
Etherley Works, Bishop Auckland, Durham.

883 & 884. Argillaceous Iron Ore.
From Botolph, and Orton Longueville, near Peterborough, Northamptonshire.
Presented by the Marchioness of Huntley.

On top shelf.

885 and 886. "Black Band" Ironstone.

887. Argillaceous Ironstone.*
Arigna Iron Mine, Arigna, Ireland.

888. Black Band.
Ayrshire, Scotland.

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* Since local Museums aided by Government grants have been established in Dublin and Edinburgh, it has not been attempted in this museum to swell the already considerable number of iron ores by exhibiting a full series of the Irish and Scotch ores. A few only have been admitted as representatives of certain interesting localities.

FOREIGN ORES.

Wall-cases 15 to 23.

The object of this Museum being principally the illustration of British minerals, a limited series only of Foreign Ores is intercalated for the purpose either of forming comparisons with our own, or of exhibiting species which have not yet been found in our home mines. For the composition of the Ores, refer to the description of the British specimens.

Ores of Copper.

Wall-case 15.

Shelf I.

1. Gabbro rosso, with Native Copper.

This rock, associated with serpentine, is noticeable as being the matrix of rich ores of Copper at *Monte Catini* and other mines in *Tuscany*.

2 to 4. Native Copper.
District of Bogoslovsk, Russia.

5. Native Copper.
Mines of Tourinsk, District of Bogoslovsk, Russia.

Shelf II.

6 to 11. Native Copper.
District of Bogoslovsk.

12. Native Copper, crystallized in dendritic form.
District of Bogoslovsk.

13. Native Copper.
Mines of Tourinsk, District of Bogoslovsk.

14. Native Copper, and Red Oxide with Hydrated Silicate of Copper.
Establishment of Taguil, Government of Perm, Russia.

15. Native Copper, with Red Oxide of Copper and Red Oxide of Iron.
Mines of Loktevsk, District of the Altai, Russia.

Nos. 2 to 15 presented by the Imperial Mining Institute of Russia.

16. Mass of Native Copper, encrusted with Red Oxide.

17. Native Copper.
Lake Superior, North America, 1839.

18. Native Copper, from Trap rocks.
Eagle River, Lake Superior.

19. Native Copper, ramified through Trap rocks.
Copper Falls Mine, Lake Superior.

Presented by J. Petherick, F.G.S.

20. Native Copper, crystallized.
Lake Superior.

21. Native Copper.
N. West Co. Mines, Lake Superior.

Shelf III.

22. Native Copper.
Forest Mine, Ontonagon, Lake Superior.

23 & 24. Native Copper, associated with crystallized Calc-spar, Epidote, and Felspar.
Forest Mine, Lake Superior.

25. Native Copper.
Keewenaw Point, Lake Superior.

26. Trap Rock, in which are found the veins of copper and silver.
Keewenaw Point.

27. Native Copper.
Eagle River Vein, Lake Superior.

28. Native Copper, accompanied by Laumonite.
Eagle Harbour, Lake Superior.

29. Native Copper, intimately mingled with Laumonite.
Lake Superior.

Shelf IV.

30. Native Copper, crystallized.
Lake Superior.

31. Native Copper, remarkably crystallized.
Copper Falls vein, near Eagle River, Lake Superior.

32. Native Copper, with native Silver and Carbonate of Lime.
Cliff Mine, Eagle River, Lake Superior.

33. Native Copper, slightly investing Carbonate of Lime.
Cliff Mine, Eagle River, Lake Superior.

34. Native Copper, cut from the mass.
Lake Superior.

35. Native Copper, in the form of a beach pebble, or fragment which has undergone attrition.
Lake Superior.
Nos. 28 to 35 presented by Joseph Peabody.

36. Native Copper.
Datholite Cove, Isle Royale, Lake Superior.

37. Native Copper.
St. Jago de Cuba, Cuba.

38. Native Copper, with Melaconite, or Black Oxide of Copper.
St. Jago de Cuba.

39. Native Copper, with Red Oxide of Copper and Malachite.
Chile.
Presented by Sir H. T. De la Beche.

Shelf V.

40. Cuprite, or Red Oxide of Copper, (*sub-oxide of Copper,*) in octohedral crystals, with Malachite.
Establishment of Taguil, Government of Perm, Russia.

41. Cuprite, crystallized in octohedrons, with Chrysocolla, or Hydrated Silicate of Copper, and Green Carbonate.
Establishmemt of Taguil, Government of Perm.

42. Red Oxide of Copper and Hydrated Silicate of Copper.
District of Bogoslovsk, Russia.

43. Red Oxide of Copper, with petrified wood.
District of Bogoslovsk.

44. Strings of Red Oxide of Copper.
District of Bogoslovsk.

45. Compact Red Oxide of Copper.
Mines of Medvoroudiansk, Russia.
Nos. 41 to 45, presented by the Imperial Mining Institute of Russia.

46. Red Oxide of Copper.
Libethen, Hungary.

47. Red Oxide of Copper, with Copper Glance, or Sulphide of Copper.
Near Siegen, Prussia.

48. Red Oxide of Copper, or Cuprite, in octohedral crystals upon native Copper.
Rheinbreitbach, near Bonn.
Presented by G. B. Greenough, F.R.S.

49. Tablet supporting five crystals of Red Oxide of Copper.
1. Octohedron.
2. Octohedron, with hollow faces of decrement.
3. Octohedron, with edges replaced by planes of the rhombic dodecahedron.
4. Rhombic dodecahedron.
5. Rhombic dodecahedron, with triangular planes of the octohedron.

From Chessy, France.

50. Cuprite, with Green Carbonate of Copper.
Chile.

51 & 52. Red Oxide of Copper.
Chile.
Nos. 50 to 52 presented by Sir H T. De la Beche.

53. Massive Cuprite, or Red Oxide of Copper.
Chile.

54. Copper Ore, chiefly Cuprite.
Chile.

55. Cuprite, or Red Oxide of Copper, in cubic crystals.
Cobre Mines, Cuba.

56. Red Oxide of Copper, with Green Carbonate of Copper and Copper Pyrites.
Cuba.
Presented by Sir H. T. De la Beche.

Shelf VI.

57. Black Oxide of Copper, Melaconite, or Kupferschwärze.
Copper Harbour, Lake Superior.

58. Black Oxide of Copper, and Green Carbonate.
St. Jago de Cuba.
Presented by Sir H. T. De la Beche.

58a. Black Oxide, with ochrey Oxide of Iron.
Russia.

59. Argentiferous Black Oxide of Copper, on Sulphate of Baryta.
Mines of Zmeinogorsk, District of the Altai, Russia.

60. Red Oxide of Copper, and Hydrated Silicate of Copper.
Mines of Pavlovsk, District of Nertchinsk, Russia.

61. Hydrous Silicate of Copper with Black Oxide of Copper.
District of Bogoslovsk.

62. Hydrous Silicate of Copper, with ochrey Oxide of Iron.
District of Bogoslovsk.
Nos. 58a to 62 presented by the Imperial Mining Institute of Russia.

63. Foliated Red Copper Ore, with Silicate of Iron.
Grünbaum Mine, near Breitenbrunn, Voigtland, Saxony.

64. Green Silicate of Copper.
Fort Wilkins, Lake Superior.

65. Chrysocolla, or *Hydrated Silicate of Copper*, with "pitch "copper ore."

66. Chrysocolla, blueish-green.
Siberia.

Shelf VII.

67. Chrysocolla, with native Copper.
District of Bogoslovsk, Russia.

68. Hydrated Silicate of Copper, on Ferruginous Clay.
District of Bogoslovsk.

69. Hydrated Silicate of Copper.
District of Bogoslovsk.

70. Hydrated Silicate of Copper, with clay.
District of Bogoslovsk.

71. Hydrated Silicate of Copper, with Black Oxide of Copper.
District of Bogoslovsk.

72. Hydrated Silicate of Copper, with Red Oxide of Copper.
District of Bogoslovsk.

73. Hydrated Silicate of Copper.
Mines of Mednoroudiansk, Russia.

74. Hydrated Silicate of Copper, with Ferruginous Clay.
Russia.

75. Hydrated Silicate of Copper.
Establishment of Taguil, Government of Perm.

76. Hydrated Silicate of Copper, with indurated Clay.
Mines of Kisnikeijew, Russia.
Nos. 67 to 76 presented by the Imperial Mining Institute of Russia.

77. Cupriferous Sandstone.
Copiapo Mines, Chile.
Presented by Frederick Grellet.

78. Pitch Copper Ore.
Dillenburg, Nassau.

79. Pitch Copper Ore, with Carbonate of Copper.
Moldawa, Bannat.

Wall-case 16.

Shelf I.

80. Cuprite, with Malachite and Chrysocolla, a very rich copper ore.
Russia.

81. Malachite, or Green Carbonate of Copper.
Mines of Kisnikeijew, Uralian Mountains.

82 & 83. Malachite, with Calcareous Spar.
District of Bogoslovsk.

84. Malachite, on Vitreous Copper Ore.
District of Bogoslovsk.

Shelf II.

85. MALACHITE, with argillaceous matter.
Establishment of Nijneitaguil, Government of Perm.

86. MALACHITE, with schistose chlorite.
Mines of Kisnikeijew.

87. MALACHITE.
Mines of Gorimeichevsk.

88. MALACHITE, on Ferruginous Clay.
Mines of Solotouchinsk, District of the Altai.

89. MALACHITE, with Hydrated Oxide of Iron and Quartz.
Mines of Solotouchinsk.

90. MALACHITE, on Eurite.
Establishment of Taguil.

91. COPPER ORE.
Mines of Voskressensk, District of Perm.

Shelf III.

92. MALACHITE, with Blue Carbonate of Copper and Red Oxide of Iron.
Mines of Solotouchinsk.

93 CARBONATE OF COPPER.
Mines of Soimonovsk, Establishment of Taguil.

94. MALACHITE, with Brown Oxide of Iron.
Establishment of Taguil.

95. MALACHITE, with Quartz.
Mines of Kisnikeijew.

96. MALACHITE, on Red Oxide of Copper.
District of Bogoslovsk.

97. MALACHITE.
District of Bogoslovsk.

Nos. 80 to 97 presented by the Imperial Mining Institute of Russia.

98 and 99. Fibrous GREEN CARBONATE OF COPPER and Red Oxide of Copper.
Chile.
Presented by Sir H. T. De la Beche.

Shelf IV.

100 and 101. CUPRIFEROUS ANTHRACITE.
Marcanton, Pyrenees, Spain.
Presented by Sir W. E. Logan.

102 and 103. MALACHITE, or Green Carbonate of Copper.
Siberia.

104. MALACHITE.
Hartz, Germany.

Nos. 102 to 104 presented by G. B. Greenough, F.R.S.

105. Mammillated MALACHITE.
Libethen, Hungary.

105 a. MALACHITE, crystallized.
Nijnei Taguil, Siberia.

106. MALACHITE, with Azurite, on earthy Oxide of Iron.

107. MALACHITE.
Nassau.
Presented by the "German Mining Company."

107 a. MALACHITE, in prismatic crystals.
Chessy, near Lyons, France.

108. MALACHITE.
China.
Presented by G. B. Greenough, F.R.S.

109. MALACHITE.
Mines of Bembe, near Loanda, West Africa.

110 and 111. GREEN CARBONATE OF COPPER, and Red Oxide of Copper.
Chile.
Presented by Sir H. T. de la Beche.

112. CHRYSOCOLLA, with Pitch Copper Ore.
Chile.

Shelf V.

113. CHESSYLITE, Azurite, or Blue Carbonate of Copper, in fine crystals.
Chessy, near Lyons, France.
This beautiful mineral was largely obtained formerly from the Chessy mines, but they have for a long time past been abandoned, or worked only on the smallest scale.

114. CHESSYLITE, group of crystals, intermixed with a little Malachite.
Chessy.

115. Very beautiful crystals of CHESSYLITE, in which a partial conversion into Malachite has taken place.
Chessy.

116. Azurite, or Blue Carbonate of Copper, with Hydrous Silicate of Copper and ochreous Oxide of Iron.
Mines of Riddersk, Russia.

117. Malachite, with Azurite, and Black Oxide of Copper.
Russia.

118. Crystallized Azurite, with Carbonate of Lead.
Mines of Solotouchinsk, District of the Altai, Russia.

119. Blue Carbonate of Copper, and Hydrated Silicate of Copper, with Ferruginous Clay.
Mines of Lasorevsk, District of the Altai, Russia.
Nos. 116 to 119 presented by the Imperial Mining Institute of Russia.

120. Blue and Green Carbonate of Copper, with Red Oxide and Copper Pyrites.
Persia.
Presented by T. Cornish.

121. Blue and Green Carbonate of Copper, upon Coal.
Kamschatka.
Presented by G. B. Greenough, F.R.S.

122. Azurite, with Allophane.
Chile.
Presented by J. Enys.

Shelf VI.

123. Chessylite, with Hydrated Silicate of Copper and Copper Pyrites.
Mines of Solotouchinsk, District of the Altai, Russia.

124. Blue Carbonate of Copper, with Malachite.
District of Bogoslovsk, Russia.

125. Blue Carbonate of Copper, on Red Oxide of Copper.
District of Bogoslovsk.

126 and 127. Blue Carbonate of Copper, and Hydrated Silicate of Copper.
Mines of Zmeinogorsk, District of the Altai, Russia.

128. Blue Carbonate of Copper, with Red Oxide and Hydrous Silicate of Copper, on Hornstone.
Mines of Zmeinogorsk.

129. Blue Carbonate of Copper and Hydrated Silicate of Copper, with Ferruginous Clay.
Mines of Beloussovsk, District of the Altai, Russia.

130. Blue Carbonate of Copper.
Establishment of Taguil, Government of Perm, Russia.
Nos. 123 to 130 presented by the Imperial Mining Institute of Russia.

131. Blue and Green Carbonates of Copper, apparently deposited as the mineralizing substances of the fossilized stem of a tree.

132. Blue and Green Carbonates of Copper, with Cinnabar.
Chova, about four leagues from the coast of Valencia, Spain.
Presented by H. W. Bristow, F.R.S.

132 a. Brochantite (*a Hydrous Sulphate of Copper*).
Nijnei Taguil, Siberia.

133. Libethenite (*Hydrated Phosphate of Copper*).
Libethen, Hungary.

134. Phosphate of Copper.
Libethen, Hungary.

135. Phosphate of Copper.
Rheinbreitbach, near Bonn, Germany.

136. Phosphate of Copper.
Near Rheinbreitbach.
Presented by G. B. Greenough, F.R.S.

136 a. & b. Ehlite (*Hydrated Phosphate of Copper*).
Nijnei Taguil, Siberia.

137. Demidovite (*Hydrated Silicate and Phosphate of Copper*).
Nijnei Taguil, Siberia.

138. Euchroite (*Hydrated Arseniate of Copper*).
Libethen, near Neusohl, Hungary.

139 and 139 a. Euchroite.
Libethen, Hungary.

140. Atacamite. (*Oxychloride of Copper*).
Torre del Greco, near Naples.
Presented by G. B. Greenough, F.R.S.

141 and 142. ATACAMITE.
Chile.
Presented by Sir H. T. de la Beche.

143. ATACAMITE, as sand.
Peru.

Shelf VII.

144. BLUE CARBONATE OF COPPER, and Red Oxide, with Clay.
Mines of Tourinsk, District of Bogoslovsk, Russia.

145. HYDRATED SILICATE OF COPPER, BLUE CARBONATE OF COPPER, and indurated Clay.
Mines of Loktevsk, District of the Altai, Russia.

146. FOSSIL WOOD, mineralized by several COPPER ORES.
Mines of Voskressensk, District of Perm, Russia.

147. GREY COPPER ORE, with Beresite.
Mines of Beresow, District of Ekaterinbourg, Russia.
Nos. 144 to 147 presented by the Imperial Mining Institute of Russia.

148. COPPER PYRITES, intimately mingled with Malachite.
St. Jago de Cuba, Cuba.

149. CARBONATE OF COPPER, RED OXIDE OF COPPER, and COPPER PYRITES.
Mineral Point, Mississippi.
Presented by the late John Taylor, F.R.S.

Shelf VIII.

150 & 151.

(Specimens to be added.)

152. ANTIMONIAL GREY COPPER ORE (Fahl-ore, or Tetrahedrite), containing 163 ozs. of silver per ton, or 0·5 per cent.
From the Silver Mines of Hiendelaencina, Province of Guadalajara (the mine Suerte).
Presented by M. Gustave de Nouvion, Madrid.

153. Mixed COPPER ORES, exceedingly rich. BORNITE and COPPER GLANCE, with pale green Steatite.
Monte Catini, Tuscany.

154. BORNITE, or Purple Copper Ore, with COPPER GLANCE.
Monte Catini, Tuscany.

155. BORNITE and COPPER GLANCE, occurring with Steatite, Serpentine, and Gabbro Rosso.
Monte Catini, Tuscany.

156. BLACK SULPHIDE OF COPPER, with Sulphate of Baryta.
Agate Harbour, Lake Superior.

Wall-case 17.

Shelf I.

157. VITREOUS COPPER ORE, or Copper Glance (*Disulphide of Copper*).
Mines of Tourinsk, District of Bogoslovsk, Russia.
Presented by the Imperial Mining Institute of Russia.

158. SULPHIDE OF COPPER, in Quartz.

159. SULPHIDE OF COPPER, with Oxide of Iron.
From the Mine called Junge hohe Birke, Freiberg, Saxony.

160. PURPLE COPPER ORE, or Bornite.
Valparaiso.

161. PURPLE COPPER ORE.
Chile.

162. SULPHIDE and CARBONATE OF COPPER.
Chile.

163. COPPER ORE, mixed.
Chile.

164. Rich disseminated COPPER GLANCE, or Sulphide of Copper.
Chile.

Shelf II.

165. BORNITE, Erubescite, Buntkupfererz, or Purple Copper Ore, (*Sulphide of Copper and Iron*).
Hammerfest, Norway.

166. BRECCIATED COPPER LODE, the fragments of stone cemented by BORNITE.
Hammerfest, Norway.
Nos. 165 and 166 presented by the late Michael Williams, M.P.

167 and 168. BORNITE.
Copiapo Mines, Chile.
Presented by Frederick Grellet.

169 and 170. BORNITE.
Chile.
Presented by Sir H. T. de la Beche.

171. BORNITE.
Dniazano Mine, Chile.

172. BORNITE, with calcareous spar.
Chile.

Shelf III.

173 and 174. BORNITE.
Chile.
Presented by Sir H. T. De la Beche.

175. Rich mingled COPPER ORES, with Calcareous Spar.

176. VITREOUS COPPER ORE, or Copper Glance, with Calcite.
Santiago, Cuba.

176a. HARRISITE (Cubic Copper Glance).
Canton, Cherokee Co., Georgia, U.S.

177. GREY COPPER ORE, with crystallized Iron Pyrites.
St. Jago de Cuba, Cuba.

178. SULPHIDE of COPPER.
Cobre Copper Mines, vicinity of St. Jago de Cuba.
Presented by Col. Stopford.

179. COPPER ORE, with crystallized Iron Pyrites.
Cobre Mines, Cuba.

180. COPPER GLANCE, with Wollastonite.
From junction of Sienite with Limestone, Mine Drey König, Orawitza, Hungary.

Shelf IV.

181. BORNITE, or Purple Copper Ore.
Hammerfest, Norway.

182. PURPLE COPPER ORE, with Brown Spar.
Hammerfest, Norway.
Nos. 181 and 182 presented by the late Michael Williams, M.P.

183. SULPHIDE OF COPPER.
District of Bogoslovsk, Russia.

184. COPPER PYRITES, with Iron Pyrites.
District of Bogoslovsk.
Nos. 183 and 184 presented by the Imperial Mining Institute of Russia.

185. COPPER PYRITES, with "Pitch Copper Ore."
Aranda de Moncayo, Aragon.

186. ARGENTIFEROUS SULPHIDE OF COPPER, very rich in silver.
St. Vincente Mine, Veta St. Antonio Ramas, Mexico.

187. ARGENTIFEROUS COPPER PYRITES, rich in silver.
S. Jose, Ramas, Mexico.
Nos. 186 and 187 presented by Major Charters, R.A.

188. ARGENTIFEROUS COPPER PYRITES.
Moran, Real del Monte, Mexico.

189. KUPFER SCHIEFER, or Copper Slate.
Eisleben, Prussian Saxony.

190. KUPFER SCHIEFER, rich variety.
Eisleben.

191. CUPREOUS SLATE, containing the fossil fish characteristic of the Kupfer Schiefer, *Palæoniscus Freieslebensis.*
Eisleben.

192. PURPLE COPPER ORE in KUPFER SCHIEFER.
Eisleben.

193. COPPER PYRITES, between laminæ of KUPFER SCHIEFER, or Copper Slate.
Eisleben.

Shelf V.

194. COPPER PYRITES, or Chalcopyrite. (*Sulphide of Copper and Iron*).
Cobre Mines, Cuba.

195. COPPER PYRITES, and Iron Pyrites.
Consolidated Cobre Mines, St. Jago de Cuba.

196. COPPER PYRITES.
St. Jago de Cuba.

197. Copper Pyrites, and Purple Copper Ore.
Cuba.
Nos. 195 to 197 presented by Sir H. T. De la Beche.

198. Copper Pyrites, with quartz.
Santiago, Cuba.

199. Copper Pyrites.
Valparaiso.

200. Copper Pyrites, and Gypsum.
Chile.
Presented by Sir W. E. Logan.

201. Magistral.
Tepesalo, near Zacatecas, Mexico.
Presented by the late J. Taylor, F.R.S.

202. Copper Pyrites in Actinolite.
Orijerfvi Mine, Finland.

203. Copper Pyrites, Galena, and Actinolite.
Orijerfvi Mine.

204. Copper Pyrites, Galena, and Blende.
Orijerfvi Mine.
Nos. 202 to 204 presented by M. Julin.

Shelf VI.

205. Copper Pyrites, and ochrey Oxide of Iron.
District of Bogoslovsk, Russia.
Presented by the Imperial Mining Institute of Russia.

206. Copper Ore, of which a great part of the dead heaps is composed, containing about 12 per cent. copper, the remainder iron pyrites.
Argana Maden, Asia Minor.

207. Copper and Iron Pyrites, better class of ore, 18 or 20 per cent. copper.
Argana Maden.

208. Copper Pyrites.
Bannat, Hungary.

209. Rich Copper Pyrites.
Schmölnitz, Upper Hungary.

210. Copper Pyrites.
Pfingstwiese, Ems.

211. Copper Pyrites and Grey Copper Ore.
Schwaben Mine, near Siegen, Rhine, Germany.

212. Copper Pyrites, compact, with Brown Spar.
St. Burkhardt Mine, Voigtland, Saxony.

213. Copper Pyrites, and Black Oxide of Copper.
Berggieshübel, Saxony.

214. Copper Pyrites.
Junge hohe Birke Mine, Freiberg, Saxony.

215. Grey Copper Ore, Copper Pyrites, &c., disseminated.
Churprinz Mine, Freiberg.

216. Kyrosite (white copper-bearing iron pyrites).
Annaberg, Saxony
Presented by G. P. Wall, F.G.S.

217. Covelline, or Kupfer indig. (*Sulphide of Copper.*)
Sangerhausen, Hartz.

218. Fahlerz, Tetrahedrite, or Grey Copper Ore, in tetrahedral crystals, with Blende.
Freiberg, Saxony.

219. Fahlerz, in tetrahedral crystals, with Blende and Quartz.
Bohemia.

220. Fahlerz, crystallized.
Servoz, Savoy.
Presented by Sir H. T. De la Beche.

221. Grey Copper Ore, or Fahlerz.
Mine of St. Carlo, Strait of Messina.

222. Grey Copper Ore, and Copper Pyrites.
Rez-banya, Hungary.

223. Fahlerz.
Kapnik, Hungary.

224. Sandstone with Fahlerz.
Herrengrund, Hungary.

225. Fahlerz, crystallized, sometimes containing Silver.
Peru.
Presented by W. Wyman.

225a. Fahlerz, in unusually large crystals.
Peru.

Shelf VII.

226. Sulphide of Copper,
Copiapo Mines, Chile.
Presented by Frederick Grellet.

227. Rich Copper Pyrites, with Spathose Iron.
From a mine near the source of the Gran, Hungary

228. Copper Pyrite (*Pirite di Rame*).
Miniere dell' Accesa, Tuscany.

229. Copper and Iron Pyrites (*Pirite di Rame e Ferro*).
Bagnolo, near Montieri, Tuscany.

230. Bornite and Copper Pyrites.
Mines of La Cava, Tuscany.

231. Copper Pyrites, with purple tarnish (*Rame piritoso pavonazzo*).
Tuscany.

Shelf VIII.

232. Copper Pyrites.
Tuscany.

233. Copper Ore, peculiar dense Pyrites.
Near Messina, Sicily.

234. Copper Pyrites in Mica Schist.
Fahlun Mines.
Presented, from the International Exhibition, 1862, by the Swedish Commissioners.

Ores of Iron.

Wall-case 18.

Shelf I.

235 to 237. Granular Magnetic Iron Ore.
District of Goro-Blagodat, Russia.

238. Magnetic Oxide of Iron, in octohedral crystals.
Goro-Blagodat, Russia.
Nos. 235 to 238 presented by the mperial Mining Institute of Russia.

239. Magnetic Iron Ore,
Marbella, near Malaga, Spain.
Presented by R. Phillips.

240. Magnetic Iron Ore.
New Jersey.

Shelf II.

241 and 242. Magnetite, or Magnetic Oxide of Iron.
Dannemora, Sweden.

243 Magnetite.
Philipstad, Sweden.

244. Magnetite.
Åker, Sweden.

245. Magnetite, with Corundum and Felspar.
Gellivara, Lapland.

246. Magnetite, with Iron Pyrites.
Finland.

247. Magnetite.
Oiamo Mine, Finland.

248. Magnetite.
Finland.
Nos. 246 to 248. Presented by M. Julin.

Shelf III.

249. Magnetite.
District of Slataoust, 10 wersts from Slataoust.
Presented by the Imperial Mining Institute of Russia.

250. Magnetite.
Modum, Norway.

251. Magnetite.
Breitenbrunn, Saxony.

252. Magnetite.
Stazzema, Tuscany.

253. Magnetite, massive granular.
Elba.

254. Magnetite, striated.
Elba.

255. Magnetite, with lamellæ of Malachite.
Elba.

256. Magnetite, crystallized in large rhombic dodecahedron.
Traversella, Piedmont.

257. Magnetite, in dodecahedral crystals.
Traversella.

258. Magnetite, boldly crystalline.

259. Magnetite, in octohedral crystals.
Monroe, Orange Co., New York.
From Dr. Feuchtwanger's collection.

260. Magnetic Iron Ore (*titaniferous*).
Arendal, Norway.

261. Magnetic Iron Ore (*titaniferous*).
Twedesrand, Norway.

Ores of Titanium.

Shelf IV.

262. Ilmenite (*Titaniferous Iron*).
Presented by Robert Mushet.

262 a. Iserine (*Titaniferous Iron*).
Krageroe, Norway.

263 & 263a. Rutile (*Titanic Acid or Oxide of Titanium*).
Langö, near Kragerö.
Presented by Robert Mushet.

264 to 266. Rutile, in crystals.
Lincoln Co., Georgia, U.S.

267. Rutile, in Apatite.
Modum, Norway.

267a. Arkansite (variety of Brookite, *Oxide of Titanium*).
Magnet Cove, Hot Springs Co., Arkansas, U.S.

268. Sphene (*Titano-silicate of Lime*).
Grisons, Tyrol.

268a. Crystal of Sphene.
Piedmont.

269. Sphene, with Adularia and Chlorite.
Switzerland.

269a. Sphene, with Arendalite.
Norway.

270. Black Titanite (Sphene) in Granite.
Norway?
Nos. 269a & 270 presented by G. B. Greenough, F.R.S.

270a. Schorlomite (*Titano-silicate of Lime and Iron*).
Magnet Cove, Arkansas, U.S.

Ores of Iron (*continued*).

Shelf V.

271 & 272. Red Iron Stone, (Hæmatite, or *Anhydrous Peroxide of Iron*), with decomposing Carbonate of Iron.
Somorostro, near Bilbao, Spain.
Presented by Lieut.-Col. Colquhoun.
The celebrated iron of Biscay is made from this ore.

273. Red Iron Ore.
Eibenstock, Saxony.

274. Red Iron Ore, compact, siliceous.
Geyer, Saxony.

275. Red Iron Ore.
Johanngeorgenstadt, Saxony.

276. Red Iron Ore.
Schellerhau, Saxony.

277. Micaceous Iron Ore.
Elba.

278. Puletta, or Micaceous Iron, washed along the beach and collected at the
Marina di Rio, Elba.

Shelf VI.

279. Hæmatite Iron, platy variety.
Schmiedeberg, Siegen, Prussia.

280. Fibrous Hæmatite, magnificent example from the length of its fibre.
Siegen.

281. Micaceous Iron Ore, in granite, near the gold lode,
Magurka, Hungary.

282. Micaceous Iron Ore.
Neubau, Fichtelgebirge, Bavaria.

283. Micaceous Iron Ore, forming a narrow vein in talcose slates,
Marina di Rio, Elba.

284. Micaceous and Granular Red Iron Ore.
Elba.

285. Iron Glance, in hexagonal tabular crystals, with Adularia.
St. Gotthard, Switzerland.

286. Specular Iron Ore (*Red Peroxide of Iron*, the *Oligist* of the Italians and French), fine example of large crystals coated with iridescent tarnish.
Rio, Elba.

287 to 290. Specular Iron Ore.
Elba.

291. Specular Iron Ore, well crystallized.
Rio, Elba.

292 & 293. Specular Iron Ore.
Rio Albano, Elba.

294. Specular Iron Ore.
From the crater of Stromboli.

295. Specular Iron Ore.
Fosso di Cancarone, Monte Somma, Vesuvius.

296. Specular Iron Ore, large tabular crystal with very splendent faces.
From the Jacotinga of the gold lode, Cocaes Mine, Brazil.
Presented by William Reay.

297. Specular Iron Ore, in unusual form of crystals.
Siegen, Prussia.

Shelf VII.

298 to 300. Specular Iron Ore.
Elba.

301. Specular Iron Ore, small crystals upon earthy hæmatite.
Elba.

302. Specular Iron Ore, the micaceous variety, forming a vein.
Elba.

303. Specular Iron Ore, sample of the ordinary ore of the Rio mines.
Elba.

Shelf VIII.

304. Specular Iron Ore, with mixture of stone, the *Vena cieca* of Rio.
Elba.

305. Specular Iron Ore, as a small vein of *ferro oligisto.*
Elba.

306. Specular Iron Ore.
Elba.

307. Crystalline Iron Ore.
Elba.

308. Cellular Brown Ore.
Elba.

309. Cellular Brown Hæmatite.
Rio, Elba.

310. Pisolitic Red Iron Ore.
From the regular bed, at the base of the carboniferous limestone, Namur and Huy, Belgium.
Largely used for smelting, 1855.

311. Red Ochre, with Brown Oxide of Iron.
District of Alapayevsk, Russia.
Presented by the Imperial Mining Institute of Russia.

312. Large mass of Argillaceous Ironstone, the surface partially oxidised.

313. Lenticular Clay Iron Ore.
Radnitz, Bohemia.

314. Globular Clay Iron Ore (Bohnerz).
Kandern, Baden.

315. Red-stained Argillaceous Iron Ore.
Maryland.

Wall-case 19.

Shelf I.

316 & 317. Brown Iron Ore, or Limonite (*Hydrous Peroxide of Iron*).
District of Alapayevsk, Russia.

318. Brown Oxide of Iron.
Russia.

319. Brown Oxide of Iron, on quartz.
19 *wersts from Ekaterinbourg, Russia.*

320. Brown Oxide of Iron.
Mines of Klutscheff, District of Slataoust, Russia.

Shelf II.

321. Brown Oxide of Iron.
Mines of Bourabinsk, District of Alapayevsk, Russia.

322. Brown Oxide of Iron.
Mine of Rasgoulayew, District of Alapayevsk, Russia.

323. Brown Oxide of Iron.
Mine of Goruneschewsk, District of Alapayevsk, Russia.

Nos. 316 to 323 presented by the Imperial Mining Institute of Russia.

324 to 326. Brown Iron Ore.
Near Columbia, Pennsylvania, U.S.

Presented by J. Trippett.

327 & 328. Brown Peroxide of Iron.
Near Columbia, Pennsylvania, U.S.

From an "iron ore mountain" 245 feet high and 21 acres in area.

Shelf III.

329. Brown Oxide of Iron, in Mica Slate.
Mines of Taganay, Establishment of Sathinsk, Russia.

330. Brown Oxide of Iron.
Mines of Taganay, District of Slataoust, Russia.

331. Brown Oxide of Iron, with Quartz.
Village of Gornoi Schfchit, 19 *wersts from Ekaterinbourg.*

332. Brown Oxide of Iron, on Quartz.
Mines of Beresow, Russia.

Nos. 329 to 332 presented by the Imperial Mining Institute of Russia.

333. Compact Brown Iron Ore (*Hydrous Peroxide of Iron*), with Kakoxene.
St. Benigna, Bohemia.

334. Fibrous Brown Iron Ore, fine example.
From Eiserfeld, Siegen, Prussia.

335. Fibrous Brown Iron Ore.
Hollerter Zug, Siegen, Prussia.

336. Fibrous Brown Iron Ore.
Siegen.

337. Fibrous Brown Ore.
Germany.

338. Brilliant Black "Hæmatite" (Glas kopf).
Eifel, Germany.

Presented by G. B. Greenough, F.R.S.

Shelf IV.

339. Göthite (*Hydrous Peroxide of iron*).
North Germany.

339a. Göthite.
Siegen, Prussia.

340. Stilpnosiderite (variety of brown ore).
Siegen, Prussia.

341. Lepidocrokite (variety of brown ore).
Siegen.

342 to 347. Brown Iron Ore.
Rio, Elba.

348. Brown Iron Ore.
Monte Valerio, Italy.

349. Brown Iron Ore.
Near Oviedo, Asturias, Spain.

350. Earthy Brown Oxide of Iron, with Carbonate of Copper.
Dillenburg, Nassau.

Shelf V.

351 to 353. Bog Iron Ore (Raseneisenstein).
Liebenwerda, Prussia.

354. Bog Iron Ore.
Patsohkau, Silesia.

355. Iron Ore.
Near Oviedo, Asturias, Spain.

Presented by the Asturias Mining Company.

356. Iron Ore.
Lake of Megri, Establishment of Olonetz, Government of Olonetz, Russia.

357. Iron Ore.
Lake of Toumasse, Establishment of Olonetz.

358. Iron Ore.
Lake of Tonda, Establishment of Olonetz.

Nos. 356 to 358 presented by the Imperial Mining Institute of Russia.

359 & 360. Kraurite, or Green Ironstone (*Hydrated Phosphate of Iron*).
Ullersreuth, near Hof, Bavaria.

361. Iron Sinter (*Arsenio-sulphate of Iron*).
Freiberg, Saxony.

Shelf VI.

362. Spathose Iron Ore, Sparry Iron Ore, Siderite, or Chalybite (*Carbonate of Iron*).
Hüttenberg, Carinthia.

363. Spathose Iron Ore, in very large rhombohedral crystals.
Hüttenberg, Carinthia.

364. Spathose Iron Ore, the crystals transformed into brown peroxide of iron.
Hüttenberg, Carinthia.

365. Spathose Iron Ore, changed into brown peroxide.
Löling, Carinthia.

366. Spathose Iron Ore, changed into brown peroxide, and coated with Mangenschaum.
Vordernberg, Styria.

367. Compact Spathose Iron Ore, with Calc-spar and talcose Greywacke Slate, locally termed "Flinz."
Vordernberg, Styria.

368. Spathose Iron Ore, crystallized.
Stolberg, Hartz.

369. Spathose Iron Ore, well crystallized, with Blende.
Hartz.

370. Spathose Iron Ore.
Lobenstein.

371. Foliated Spathose Iron Ore (Grobspaltiger Spatheisenstein).
From the Mine Turandot, on the Sieg, Prussia.

372. Spathose Iron Ore.
Siegen, Prussia.

373. Spathose Iron Ore.
Hachenburg, Nassau.

374. Spathose Iron Ore, in large lenticular crystals with iridescent faces.
Dauphiné.

375. Roeform Clay Iron Ore.
Carlsbad, Bohemia.

376. Clay Ironstone.
Kreuzberg, Silesia.

377. Clay Ironstone.
Krappitz, Upper Silesia.

378. Ironstone.
Southern Anthracitic Coal-field, near Pottsville, Pennsylvania.

Shelf VII.

379 to 381. Lievrite, Yenite, or Ilvaite (*Silicate of Iron*).
Rio, Elba.

382. Lölingite, Arsenical Pyrites, or Glanzarsenikkies (*Arsenide of Iron*).
Reichenstein, Silesia.

383. Arsenical Pyrites, in Serpentine.
Reichenstein, Silesia.

384. Mispickel, or Arsenical Pyrites (*Arsenio-sulphide of Iron*), crystallized, with Galena and Iron Pyrites.
Himmelfahrt Mine, Freiberg, Saxony.

Presented by H. Bauerman, F.G.S.

385. Arsenical Pyrites.
Rio, Elba.

386. Arsenic Ore (Mispickel).
From the Tin Mines, Jackson, N.H.

387. Mispickel, with Copper Pyrites.
From Mine Dreykönig, Orawitza, Bannat.

388. Mixed Ore and Gossan.
From Theresa Mine, Orawitza, Bannat.
Occurs in nodules in the limestone and garnet rock.

389 to 391. Iron Pyrites (*Bisulphide of Iron*), decomposing.
Mines of Beresow, District of Ekaterinbourg, Russia.

Shelf VIII.

392. Iron Pyrites, in Argillaceous Schist.
District of Goro-Blagodat, Russia.

393. Iron Pyrites, in Clay Slate.
District of Goro-Blagodat.
Nos. 389 to 393 presented by the Imperial Mining Institute of Russia.

394 & 395. Iron Pyrites (*Bisulphide of Iron*), crystallized in pentagonal dodecahedrons.
Rio, Elba.

396. Iron Pyrites, in aggregated crystals.
Rio, Elba.

397. Iron Pyrites.
Elba.

398. Magnetic Iron Pyrites, or Pyrrhotine (*Sulphide of Iron*).
Bodenmais, Bavaria.

399. Magnetic Pyrites.
Morro Velho, Brazil.
Presented by J. Hockin, Managing Director of the St. John del Rey gold mines.

400. Magnetic Pyrites, crystallized on Dolomite Spar.
Morro Velho Gold lode, Brazil.
Presented by William Reay.

401. Chrome Iron Ore, or Chromite.
Asia Minor.
Oxide of chromium 45 per cent., with oxides of iron and manganese, and alumina.
Analysed and presented by the late T. H. Henry, F.R.S.

402. Chrome Iron Ore, (*Chromate of Iron*).
River Aktouba, District of Slataoust, Russia.
Presented by the Imperial Mining Institute of Russia.

403. Chrome Iron Ore.
Silesia.

404. Chrome Iron Ore.
Styria.
Presented by G. D. Midgley.

405. Chrome Iron Ore.
Kraubat, Styria.
Presented from the International Exhibition, 1862, by the Austrian Commissioners.

406. Chrome Iron Ore.
Gassin, Département du Var, France.
Presented by G. D. Midgley.

407. Chrome Iron Ore.
Gassin, France.
Presented by Richard Phillips.
One of the earliest known specimens of chromate of iron. It was in the collection of Vauquelin, by whom it was presented to Mr. R. Phillips in 1802.

408. Chrome Iron Ore.
Baltimore, U.S.
Presented by G. D. Midgley.

409. Oxide of Chrome.
Ecouchets, Burgundy.

Ores of Manganese.

Several of the Oxides of Manganese represented in the following list are largely imported into England from the German mining districts.

Wall-case 20.

Shelf I.

410. Pyrolusite (*Anhydrous Binoxide of Manganese*).
Nassau.

411. Pyrolusite.
Ilmenau, Thuringia.

412. Manganese Ore.
Elba.

413. Manganese Ore.
Eisern, near Siegen, Prussia.

414. Oxide of Manganese.
Siegen.

415. Black Wad (Braunsteinschaum).
District of Bogoslovsk, Russia.
Presented by the Imperial Mining Institute of Russia.

416. Polianite (variety of Pyrolusite).
Platten, Bohemia.

Shelf II.

417. Psilomelane; compact manganese ore.
Langeberg, Saxony.

418. Hausmannite (*Protoxide and Sesquioxide of Manganese*).
Friedrichsrode, in the Hartz.

419. Braunite, (*Anhydrous Sesqui-oxide of Manganese*), crystallized.
Ilmenau, Thuringia.

420 & 420a. Manganite (*Hydrated Sesquioxide of Manganese*), crystallized.
Ihlefeld, Hartz.

421. Diallogite (*Carbonate of Manganese*), with Galena.
Beschert Glück Mine, near Freiberg, Saxony.

421a. Diallogite (Manganspath).
Freiberg.
Presented by C. Le Neve Foster, F.G.S.

422. Siliceous Manganese Spar.
Josephi vein, Kapnik, Hungary.

422a. Rhodonite (*Silicate of Manganese*).
Kapnik.

423. Manganese Blende, or Alabandine (*Sulphide of Manganese*).
Kapnik, Hungary.

424. Manganese Blende.
District of Bogoslovsk, Russia.
Presented by the Imperial Mining Institute of Russia.

424a. Hauerite (*Bisulphide of Manganese*).
Kalinka, Hungary.

Ores of Bismuth, Molybdenum, Uranium, &c.

Shelf III.

425. Native Bismuth.
Bohemia.

426. Cupreous Bismuth.
Bräunsdorf, Freiberg, Saxony.
Nos. 425 and 426 presented by G. B. Greenough, F.R.S.

427. Aikenite, or Aciculite (*Plumbo-cupriferous Sulphide of Bismuth*).
Uralian Mountains.
Presented by the Imperial Mining Institute of Russia.

428. Eulytine, or Bismuthblende (*Silicate of Bismuth*).
Schneeberg, Saxony.

429. Molybdenite (*Sulphide of Molybdenum*).
Zinnwald, Bhemia.

430. Molybdenite, and Galena in Quartz vein.
Greenland.

431. Molybdenite, said to be highly argentiferous.
From Cerro-de-Pasco, Chile.
Presented by Col. Lloyd.

432. Pitchblende (*Proto-peroxide of Uranium*).
Johanngeorgenstadt, Saxony.

433. Pitchblende, occurring in the Cobalt veins.
Schneeberg, Saxony.

434. Cerite (*Hydrous Silicate of the Oxides of Cerium, Lanthanium, Didymium, &c.*) See also p. 183.
Riddarhyttan, Sweden.

Ores of Tin.

The production of Tin from the continental mines has for centuries past been inconsiderable in comparison with that from Cornwall and from Banca and the "Straits." Many of its localities are, however, highly interesting, and it is observable that the veins and "stockworks" in which the ore is found, are uniformly in or near granitic rocks in Brittany, North-western Spain, Saxony, and Bohemia.

Shelf IV.

435. Cassiterite, or Tin Stone (*Binoxide of Tin*).
Province of Pontevedra, Galicia, Spain.

436 and 436a. Cassiterite.
Spain.

437. Cassiterite, macled or twin crystal.
Brittany.

438 and 439. Crystals of Cassiterite.
Brittany.

440 and 441. Cassiterite, columnar crystals of unusual size.
Brittany.

442. Cassiterite.
Pointe de Piriac, Loire Inferieure, 1813.

443. Cassiterite.
Sauberg, near Geyer, Saxony.

444. Cassiterite.
Bohemia.

445. Cassiterite.
Zinnwald, Bohemia.

446. Cassiterite, crystallized.
Zinnwald.

447. Cassiterite, crystallized.
Schlaggenwald, Bohemia.

448. Cassiterite, crystallized (variety of black tin).
Graupen, Bohemia.

449. and 450. Cassiterite.
Mines of Ononsk, Baikal, Russia.
Presented by the Imperial Mining Institute of Russia.

451. Cassiterite, in Quartz vein.
Arksut-fiord, Greenland.

452. Cassiterite, a vein in compact Mica-slate.
Jackson, New Hampshire.

452a. Botryoidal Oxide of Tin.
Brazil.

Ores of Wolframium, Cobalt, and Nickel.

The ores of these metals seldom occur in quantity, and are for the most part subsidiary to other substances, and associated with the ores of Tin, of Copper, and of Silver. Wolfram, although experimentally applied to several purposes, is not yet in demand; but the important applications of Cobalt and Nickel render their ores a valuable object of research in Saxony, Thuringia, Norway, &c.

Shelf V.

453. Wolfram (*Tungstate of Iron*).
Zinnwald, Bohemia.

454. Wolfram, large prismatic crystal.
Zinnwald.

454a. Scheelite (*Tungstate of Lime*), crystallized.
Traversella, Piedmont.

455. Erythrine, or Cobalt Bloom (*Hydrated Arseniate of Cobalt*).
Schneeberg, Saxony.

456. Red Cobalt Ochre.
Schneeberg, Saxony.

457. Red earthy Cobalt.
Schneeberg.

458. Red Cobalt Ore, on Iron Sinter.
Schneeberg.

459. Cobalt Ore, a vein.
Adam Heber Mine, Schneeberg.

460. Smaltine, or Speiskobalt (*Arsenide of Cobalt*).
Schneeberg.

461. Arsenical Cobalt, with Native Silver.
Schwartzwald.

Shelf VI.

462. Black earthy Cobalt, a vein in Granite.
Wolfach, Baden.

463. Black earthy Cobalt.
Saalfeld, Thuringia.

464. Earthy Cobalt.
Saalfeld, Thuringia.

465. Brown earthy Cobalt.
Kaulsdorf, Thuringia.

466. Yellow-brown earthy Cobalt, with Grey Copper.
Kaulsdorf, Thuringia.

467. Grey Cobalt.
Schneeberg, Saxony.

468. Cobaltine, Silver-white Cobalt, or Cobalt Glance (*Arsenio-sulphide of Cobalt*).
Tunaberg, Sweden.

469. Cobaltine.
Tunaberg.

470. Cobaltine, crystal.
Tunaberg.
Presented by G. B. Greenough, F.R.S.

471. Sulphide of Cobalt.
Venna Grufen, Norway.

472. Sulphide of Cobalt.
Modum, Norway.

473. Smaltine, Speiskobalt, or Chloanthite (*Arsenide of Cobalt and Nickel*).
From the mine called Weisser Hirsch, Schneeberg, Saxony.
Presented by G. P. Wall, F.G.S.

474. Arsenical Cobalt (Gestrickter Speiskobalt).
Schwarzenberg, Saxony.

475. Cobalt-Nickel Glance (*Arsenio-sulphide of Cobalt and Nickel*).
From the Mine Jungfer and Adler, near Müsen, Siegen, Prussia.
Presented by Herr Von Dechen.

476. Kupfernickel, or Copper-nickel (*Di-arsenide of Nickel*), with White Nickel Pyrites.
Schneeberg, Saxony.

477. Antimonio-arsenical Nickel.
Schlösschen, Lobenstein, Germany.

478. Antimonial Nickel.
Lobenstein.

478a. Breithauptite (*Antimonial Nickel*).
Andreasberg, Hartz.

478b. Millerite (*Sulphide of Nickel*).
Gap Mine, Lancaster Co., Pennsylvania.

479. Arseniate of Nickel, with Carbonate of Iron.
Müsen, Siegen, Prussia.

480. Emerald Nickel (*Hydrous Carbonate of Nickel*), on Chrome Iron Ore.
Texas, Pennsylvania.

Ores of Antimony.

481. Native Antimony.
Allemont, Dauphiné.

481a. Native Antimony.
Borneo.

482. Valentinite, or White Antimony (*Teroxide of Antimony*).
Mies, Bohemia.

482a. Senarmontite, or Octohedral White Antimony (*Teroxide of Antimony*).
Algiers.

482b. Cervantite (*Oxide of Antimony*).
Spain.

Shelf VII.

483. Oxide of Antimony.
Borneo.

483 a. Oxide of Antimony, pseudomorphous after Antimony Glance.
Borneo.

483b. Kermesite, or Red Antimony (*Oxysulphide of Antimony*).
Bräunsdorf, Saxony.

483c. Kermesite.
Neue Hoffnung Gottes, Bräunsdorf, Saxony.
Presented by H. Bauerman, F.G.S.

484 & 484a. Antimonite, Stibnite, Grey Antimony, or Antimony Glance (*Sulphide of Antimony*).
Felsöbanya, Hungary.

485. Antimonite, in fine prismatic crystals.
Felsöbanya, Hungary.
Raised in 1851–2.

486. Zinkenite (*Sulphantimoniate of Lead*).
Wolfsberg, Hartz.

487. Bleiniere (*Antimoniate of Lead*), with 60 or 80 ozs. of silver per ton.
Spain.

Shelf VIII.

488. Antimonite.
Spain.

489 and 489a. Antimonite.
Tuscany.

490. Antimonite, iridescent.
Felsöbanya, Hungary.

491. Antimonite.
Wolfsberg, Hartz.

492. Antimonite.
Neue Hoffnung Gottes Mine, near Freiberg, Saxony.

493. Antimonite.
Arensberg, Prussia.

494. Antimonite.
Brilon, Prussia.

495. Granular Antimonite, with imbedded Quartz.

496. Antimonite. with Oxide of Antimony.
Borneo.

497 and 497a. Antimonite.
Borneo.

498. Antimonite.
Carmel, U.S.

Ores of Zinc.

With the exception of the New Jersey mineral, Zincite, the ores useful for the production of the metal are limited almost entirely to the minerals rather loosely termed Calamine, including the Carbonates and the Silicates, hydrous and anhydrous, and to Blende, the Sulphide of Zinc. The most important centres of the mining for Zinc ores are Belgium, Silesia, and the North of Spain.

Wall-case 21.

Shelf I.

499. Zincite, Spartalite, or *Red Oxide of Zinc*, with Franklinite.
New Jersey, U.S.
Presented by O. Macdaniel, 1851.

500. Zincite, with Franklinite.
New Jersey.

501. Franklinite (*Oxides of Iron, Zinc, and Manganese*).
New Jersey.

502 and 503. Calamine, or Zinc spar (*Carbonate of Zinc*).
Belgium.
From the Great Exhibition, 1851.

Shelf II.

504. Calamine, crystallized and cavernous.
Near Aix-la-Chapelle, or Aachen.

505 & 506. Calamine.
Belgium.
Nos. 504 to 506 presented by the Vieille Montagne Company.

507 and 508. Calamine.
Altenberg, Aachen.

509 and 510. Calamine, and Siliceous Calamine or Silicate of Zinc.
Altenberg, Aachen.

511. Calamine.
Rez-banya, Hungary.

Shelf III.

512. Calamine.
Rez-banya, Hungary.

513. White Calamine.
Kremnitz, Hungary.

514. White Calamine.
Spain.

515. Zinc Blende (*Sulphide of Zinc*), accompanying Galena,
In the Spital Lode, Schemnitz, Hungary.

516. Zinc Blende.
Spital Lode, Schemnitz.

517. Zinc Blende, crystallized, with Red Silver, Quartz, and Calc-spar.
Przibram, Bohemia.

518 to 520. Zinc Blende.
Belgium.
From the Great Exhibition, 1851.

521. Compact Blende, termed "Schalen-blende."
Brennig, near Aachen.

522. Zinc Blende, and Magnetic Iron Pyrites.
Bodenmais, Bavaria.

523. Argentiferous Blende.
Pont Pean Mines, near Rennes.
Presented by J. Hunt.

524. Argentiferous Blende.
Mines of Talovsk, District of the Altai, Russia.
Presented by the Imperial Mining Institute of Russia.

Ores of Lead.

Lead ores are worked, more or less, in most foreign countries, but the districts more remarkable for their occurrence in large quantity are the South of Spain, the Western United States, the Hartz, Saxony, Silesia, Belgium and Rhine Prussia, Lower Hungary, Carinthia, Bohemia, the Island of Sardinia, and the Ural mountains. Great Britain, however, stands pre-eminently at the head of all lead-producing countries.

Shelf IV.

525. Cerussite (*Carbonate of Lead*), crystallized on Brown Oxide of Iron.
Mines of Pavlovsk, District of Nertchinsk, Russia.

526. Cerussite, crystallized, with Galena, or Sulphide of Lead.
Mines of Beresow, Uralian Mountains.

527. Black Carbonate of Lead, Galena, and Arsenide of Lead.
Mines of Riddersk, District of the Altai, Russia.

528. Carbonate of Lead, with Ferruginous Clay.
Mines of Riddersk.

529 & 529 a. Carbonate of Lead, with Red Oxide of Iron, on Hornstone.
Mines of Zmeinogorsk, District of the Altai, Russia.
Nos. 525 to 529a, presented by the Imperial Mining Institute of Russia.

530. Cerussite, crystallized on Iron Ochre.
Siberia.

531 & 532. Cerussite, in acicular crystals.
Clausthal, Hartz.

533. Cerussite, on Galena.
Bleiberg, Carinthia.

534. Cerussite, crystallized.
Wheatley Mine, Chester Co., Pennsylvania.

534a. Carbonate of Lead.
Mexico.

535. Lead Earth, a dull and impure variety of Carbonate of Lead.
Tarnowitz, Silesia.

Shelf V.

536. Anglesite (*Sulphate of Lead*).
Belgium.

537 & 538. Anglesite, in fine crystals.
*Monte Poni, Sardinia.**

539 to 540. Anglesite, crystallized.
Wheatley Mine, Chester Co., Pennsylvania.
Presented by Charles Sanderson.

541 & 542. Crocoisite or Chromate of Lead, crystallized, with Brown Oxide of Iron.
Mines of Beresow, Uralian Mountains.

543. Melanochroite (*Sesquichromate of Lead*), on Quartz.
Mines of Beresow.
Nos. 541 to 543 presented by the Imperial Mining Institute of Russia.

544. Crocoisite (*Chromate of Lead*).
Brazil.

Shelf VI.

545. Chromo-molybdate of Lead.
Wheatley Mine, Chester Co., Pennsylvania.

546. Molybdate of Lead.
Bleiberg, Carinthia.

547. Wulfenite (*Molybdate of Lead*), crystallized.
Bleiberg, Carinthia.

548. Vanadinite (*Vanadate of Lead*), with Phosphate of Lead.
Mines of Beresow, Siberia.

549. Pyromorphite, or Green Lead Ore (*Phosphate of Lead*), on Beresite.
Mines of Beresow.
Presented by the Imperial Mining Institute of Russia.

550. Pyromorphite.
Siberia.
Presented by G. B. Greenough, F.R.S.

551. Pyromorphite, in ochreous Vein-stone.
Dognacska, Bannat, Hungary.

552. Pyromorphite.
Ussingen, Nassau.

553. Pyromorphite, in crystals unusually large.
Nassau.
Presented by the Government Director of Mines of Nassau.

554. Pyromorphite, with Cerussite.
Wheatley Mine, Chester Co., Pennsylvania.

555. Pyromorphite, crystallized.
Wheatley Mine.
Presented by Charles Sanderson.

556 and 557. Bournonite, (*Antimonio-sulphide of Lead and Copper*).
Neudorf, Hartz.

558 & 558a. Bournonite (*Radelerz*).
Kapnik, Hungary.

559. Boulangerite (*Antimonio-sulphide of Lead*).
Linz, Rhine.

560. Plagionite (*Antimonio-sulphide of Lead*).
Hartz.

Shelf VII.

561. Galena (*Sulphide of Lead*).
Mordgrube Mine, Freiberg, Saxony.

562. Galena, and Grey Copper.
Mordgrube Mine, Freiberg.

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* A series of very beautiful lead "spars," Anglesite and Cerussite, was presented to the Museum by the Directors of the very productive mine of Monteponi, in the Island of Sardinia, 1862.

563. Galena, Hepatic Iron Pyrites, Barytes, and Fluor Spar, in Gneiss.
Churprinz Mine, near Freiberg.

564. Argentiferous Lead Ore.
From the richest part of Josephi Vein, Kapnik, Eastern Hungary.

565. Zinciferous Galena.
Pont Pean Mines, near Rennes.
Presented by J. Hunt.

566. Silver Lead Ore.
Esperanza Mine, Sierra Almagrera, Kingdom of Granada, Spain.
Presented by W. Penrose Mark.

567. Argentiferous Galena.
Crapanara Mine, Peloritan Mountains, Messina, Sicily.

568. Argentiferous Galena, with Zinc Blende, &c.
Aga Mine, Kiaban Maden, South Armenia.

569. Argentiferous Galena, with Zinc Blende, Pyrites, &c.
Georg Mine, Kiaban Maden.

570. Argentiferous Galena.
Shelburne Lead Mine, New Hampshire.

571. Argentiferous Galena, Brown Spar and Pyrites.
Shelburne Lead Mine, N. H.

Shelf VIII.

572. Galena, with Brown Oxide of Iron.
Mines of Beresow, Uralian Mountains.

573. Galena.
Establishment of Taguil, Government of Perm, Russia.
Nos. 572 & 573 presented by the Imperial Mining Institute of Russia.

574. Galena, with Carbonate of Lime.
Occurring in limestone near Radoboj, Croatia.

575. Galena.
Pfaffenberg Mine, Hartz.

576. Galena, with Sparry Iron Ore.
Wolfsberg, Hartz.

577. Galena, in octohedral crystals, with plumose Antimony Ore, &c.
Serravezza, Tuscany.

578. Galena, fine grained, mingled with Blende.
Serravezza, Tuscany.

579. Galena, coarse grained.
Tuscany.

580. Argentiferous Galena.
Mine of Bottino, Serravezza, Tuscany.

581. Galena, crystalline, with Pearl Spar.

582. Galena, lamellar, "Potters' Ore."

583. Argentiferous Lead Ore.
Alotepii, Guatemala, Central America.

Ores of Silver.

Many of the following substances are true minerals of Silver, but it will be observed that in common language the term Silver-ore ordinarily includes many mere aggregates of other minerals or of rocky veinstone, in which the dissemination of minute particles of silver minerals gives a special value to the mass.

Wall-case 22.

Shelf I.

584. Native Silver, with Native Copper and Red Oxide of Copper.
Lake Superior, North America.

585 & 586. Silver Ore.
Cosala, Mexico.

587 & 588. Silver Ore.
Subiata, Mexico.

589. Silver Ore.
Huichichila, near Tepei, Mexico.

Shelf II.

590. Sulphide of Silver.
Guanaxuato, Mexico.

591. Silver Ore (*Antimonial Sulphide*), and Galena, with Veinstone attached.
Biscania Mine, Real del Monte, Mexico.

592. Silver Ore (*Antimonial Sulphide*), with Galena.
Terreros Mine, Biscania Vein, Real del Monte, Mexico.

593. Silver Ore, on Quartz.
Dolores Mine, Biscania Vein, Real del Monte, Mexico.

Nos. 591 to 593 presented by the late John Taylor, F.R.S.

594. Silver Ore, with Native Silver.
Zacatecas, Mexico.

Presented by John Taylor, jun., F.G.S.

595. Silver Ore, with Copper Pyrites.
Zacatecas, Mexico.

Shelf III.

596. Silver Ore.
Bolanos, Zacatecas, Mexico.

597. Sulphide of Silver, with Copper Pyrites and Galena.
Bolanos, Mexico.

598. Sulphide of Silver, with Copper Pyrites and Galena.
Real del Monte, Mexico.

599. Sulphide of Silver, with Copper Pyrites and Galena.
Fresnillo, Mexico.

600. Sulphide of Silver, with Calcareous Spar.
Guadalcanal, Spain.

Presented by Henry Southern.

601 & 602. Sulphide of Silver, with Argillaceous Schist.
Mines of Zmeinogorsk, District of the Altai, Russia.

603 & 604. Sulphide of Silver, on Hornstone.
Mines of Zmeinogorsk, Russia.

605. Sulphide of Silver, with Auriferous Silver, on Hornstone.
Mines of Zmeinogorsk, Russia.

Shelf IV.

606. Auriferous Silver Ore, with Sulphide of Silver.
Mines of Zmeinogorsk, Russia.

607 & 608. Native Silver, with Black Sulphide of Silver.
Mines of Zmeinogorsk, Russia.

609. Native Silver on Hornstone.
Mines of Zmeinogorsk, Russia.

610. Native Silver, with Sulphate of Baryta.
Mines of Zmeinogorsk, Russia.

611. Native Silver, on Hornstone, with Zinc Blende.
Mines of Sémenovsk, District of the Altai, Russia.

Nos. 601 to 611 presented by the Imperial Mining Institute of Russia.

612. Native Silver, capillary, a fine example of the occurrence of Native Silver with Sulphides and crystallized Quartz.
Real del Monte, Mexico.

613. Native Silver, in Gneiss.
Kongsberg, Norway.

614. Native Silver, capillary, in a hornstone vein in Gneiss.
Schneeberg, Saxony.

615. Native Silver, foliated, in Gneiss.
Schneeberg, Saxony.

616. Native Silver, and Argentiferous Galena, with Sulphides of Iron and Zinc, coating crystals of quartz.
South America.

Shelf V.

617. Silver Ore, with Native Silver.
Catorce, Mexico.

618. Silver Ore.
Santa Fe, Bolanos, Mexico.

619. Silver Ore.
Moran, Real del Monte, Mexico.

Contains 32 mares of silver per carga, and 1½ ounces per carga of gold.

Nos. 617 to 619 presented by Major Charters, R.A.

620. NATIVE SILVER, in Calcareous spar.
Peru.
Presented by G. B. Greenough, F.R.S.

621. NATIVE SILVER.
Chañarcillo, Copiapo, Chile.

622. NATIVE SILVER.
Fresnillo, Mexico.

623. NATIVE SILVER.
Cordova, Mexico.

624 & 625. NATIVE SILVER.
Moreles, Mexico.

626. NATIVE SILVER.
Esperanza Mine, Mexico.

627. NATIVE SILVER, with Native Copper.
Minnesota Mine, near Ontonagon, Lake Superior.
Presented by G. P. Wall, F.G.S.

628. NATIVE SILVER, and Copper.
Lake Superior.

629. NATIVE SILVER, and Copper, chiselled out of the vein.
Cliff Mine, Eagle River, Lake Superior.
Presented by Dr. Hodge.

630. NATIVE SILVER.
Copper Falls, Lake Superior.

631. NATIVE SILVER, disseminated and granular.
Luz de Pilar, Tres Puntas, Chile.

632. Solid NATIVE SILVER. Blasted from a vein 9 inches thick and occurring in masses of several hundredweight.
San Francisco, Chañarcillo, Chile.

632 a & b. NATIVE SILVER.
Chile.

633. NATIVE SILVER, a natural wire, with carbonate of lime.
San Francisco, Chañarcillo, Chile.

634. NATIVE SILVER, a natural wire, with calcite.
Oriente, Tres Puntas, Chile.
Nos. 631 to 634 presented by H. R. H. Prince Albert.

635. NATIVE SILVER, on Silver Glance, in a druse of crystals of calcite, with rose spar and galena.
Vereinigt Feld Mine, near Freiberg, Saxony.
Presented by W. T. Blanford.

Shelf VI.

636. ARSENICAL SILVER ORE ("piedra fria"), with masses of Native Silver, disseminated through carbonate of lime.
San Francisco, Chañarcillo, Chile.

636 a. ARSENICAL SILVER, with Antimonial and Native Silver.
Esperanza, Tres Puntas, Chile.
Nos. 636 & 636 a. presented by H.R.H. Prince Albert.

637. ARGENTITE, or Silver Glance (*Sulphide of Silver*), in cubic crystals, associated with crystallized gypsum.
Mexico.
Presented by Percy D'Oyle.

637 a. MIARGYRITE (*Sulphide of Silver and Antimony*).
Freiberg, Saxony.

638. PYRARGYRITE, Argyrythrose, Red Silver, or Ruby Blende (*Sulphide of Silver and Antimony*).
South America.

639. RED SILVER ORE.
St. Cecilia Mine, Guadalajara, Spain.

640. SILVER ORE, chiefly RED SILVER.
Joseph Adit, Hodritsch, near Schemnitz, Hungary.

641. RED SILVER ORE, crystallized.
Thurgarten, Hodritsch, Schemnitz.

642 & 642 a & b. PYRARGYRITE, in unusally fine crystals.
Mexico.
Presented by Percy D'Oyle.

643. Crystals of RED SILVER, with "plomo ronco," on horny limestone.
Delirio, Chañarcillo, Chile.
Presented by H. R. H. Prince Albert.

644. PROUSTITE, Light Red Silver Ore, or Arsenical Silver Blende, on Magnetic Pyrites.
Johanngeorgenstadt, Saxony.
Presented by G. P. Wall, F.G.S.

644 a. STERNBERGITE (*Sulphide of Silver and Iron*).
Joachimstahl, Bohemia.

645. FLEXIBLE SULPHIDE of SILVER.
Guadaloupe-y-Calvo, Mexico.

646. POLYBASITE (*Arsenio-antimonio-sulphide of Silver and Copper*).
Mexico.

647. NATIVE SILVER, and Silver Ore.
Mexico.

648. NATIVE SILVER, crystallized with Native Copper.
Lake Superior.

649. STEPHANITE, or Brittle Silver Ore (*Sulphide of Silver and Antimony*), crystallized.
Schemnitz, Hungary.

650. STEPHANITE, with Copper Pyrites.
Schemnitz, Hungary.

651. STEPHANITE. Characteristic sample of a very rich lode.
Hodritsch, near Schemnitz, Hungary.

651 a. STEPHANITE, or Brittle Ore, along with other silver ores, Rock Crystal and Copper Pyrites.
Stephan lode, Schemnitz, Hungary.

652. FREIESLEBENITE, or Schilfglaserz (*Antimonio-sulphide of Silver and Lead.*)
Hiendelaencina Mines, Guadalajara, Spain.
Presented by H. W. Bristow, F.R.S.

653. FREIESLEBENITE, the ore which has yielded the chief profits at the
Hiendelaencina Mines, Guadalajara.
Presented by W. W. Smyth, F.R.S., 1860.

654. IODYRITE, or Iodite (*Iodide of Silver*), with Native Silver, on Limestone.
Delirio, Chañarcillo, Chile.

655. KERARGYRITE, Kerate, or Horn Silver (*Chloride of Silver*).
Codecedo, Tres Puntas, Chile.
Nos. 654 & 655 presented by H. R. H. Prince Albert.

656. SILVER ORE (Chloride).
Copiapo, Chile.

657. KERARGYRITE.
South America.

658. KERARGYRITE, with Argillaceous schist.
Mines of Zmeinogorsk, district of the Altai, Russia.
Presented by the Imperial Mining Institute of Russia.

Shelf VII.

659. SILVER ORE (Chloride).
Copiapo, Chile.

660. SILVER ORE.
Panoco, Zacatecas, Mexico.

661. SILVER LODE, with RED SILVER ORE and Galena.
Saxony.

662. SILVER LEAD ORE.
Esperanza Mine, Sierra Almagrera, Kingdom of Granada, Spain.

663. SILVER LEAD ORE.
"Virgen del Carmen" Mine, Sierra Almagrera, Granada, Spain.

664 to 666. SILVER LEAD ORE.
Observation Mine, Sierra Almagrera, Granada, Spain.
Nos. 662 to 666 presented by W. Penrose Mark.

Shelf VIII.

667. Rich SILVER ORE.
From Nepomuk lode, Hodritsch, Schemnitz, Hungary.

668. Rich Silver Ore, containing 90 oz. of auriferous silver in 100 lbs.
From the Theresa lode, near Rosa Winze, in Mine Schmidtnerinn Stollen, Schemnitz, Hungary.

669. Silver Ore (*Weisserz*, Argentiferous Mispickel).
Bräunsdorf, Saxony.

670. Galena, with Fahlerz, containing 3 per cent. of Silver.
From the Mine Turandot, near Wissen, on the Sieg.

671. Sulphide of Silver.
Guadalcanal, Spain.
Presented by Henry Southern.

672. Polybasite.
Mexico.

673. Antimonial Sulphide of Silver, in veins of quartz traversing clay slate.
El Corro de Proaño, Fresnillo, Mexico.

674. Antimonial Sulphide of Silver.
Fresnillo, Mexico.

675. Red Silver Ore.
Zacatecas, Mexico.

676. Rich Silver Ore.
From the Comstock Vein, Virginia City, Utah Territory.
Presented by Melville Attwood, 1860.

677. Silver Ore.
From the Mine "4 Amigos," or "4 Friends," Arqueros, Coquimbo, Chile.
Presented by David Ross.

Wall-case 23.

Shelf I.

678. Native Silver.
Mines of Tourinsk, District of Bogoslovsk, Russia.
Presented by the Imperial Mining Institute of Russia.

679. Silver Ore, with Amethystine quartz, &c.
Mexico.

680. Silver Ore, Sulphide disseminated in Veinstone.
Biscania Mine, Real del Monte, Mexico.

681. Silver Ore, Sulphide with blende.
Terreros Mine, Biscania Vein, Real del Monte, Mexico.

682. Silver Ore.
Biscania Vein, Real del Monte, Mexico.
Nos. 679 to 682 presented by John Taylor.

Ores of Gold.

Besides the examples in which Gold is found comparatively pure in lodes and in stream works, a number of the veinstones or matrices of lodes are exhibited, in which particles of Gold are disseminated, often invisible, but yet in sufficient quantity to render them available, as ores of this valuable metal.

Shelf II.

683 to 685. Native Gold, in quartz.
Mines of Beresow, 18 wersts from Ekaterinbourg, Uralian Mountains, Russia.
Presented by the Imperial Mining Institute of Russia.

686 & 687. Auriferous Vein, composed chiefly of iron pyrites and quartz, with walls of talcose slate.
Vaucluse Mines, Orange Co., Virginia, U.S.

688. Auriferous Vein-stuff.
From a lode 8 feet wide, at the South Whim Shaft, 10 fathoms level, Vaucluse Mines, Virginia.

689. Auriferous Vein-stuff, rich in gold.
From a lode about 2 feet wide in the 7 fathoms level, Vaucluse Mines, Virginia.
Nos. 686 to 689 presented by Thomas Crosse.

690. Native Gold, in a veinstone.
North Carolina, U.S.
Presented by John Taylor, jun.

691. Native Gold, and Gold Ore.
From various localities in Mexico.

692. Native Gold, and Gold Ore.
Guadaloupe-y-Calvo, Sonora, Mexico.

693. Gold Ore.
Sonora, Mexico.

694. Native Gold, dispersed through a vein of quartz.
Antiochia, New Grenada.

695. Native Gold, with Palladium.
Gongo Soco, Minas Geraes, Brazil.

696. Model of a Gold Nugget.
Found at Sampson's Creek, California.

697. Native Gold, in silicate of Copper.
Tres Puntas, Chile.

Shelf III.

698. Gold Ore, containing 137 "denär" in 100 lbs.
From the 22nd level in the Mine Bacher Stolln, Schemnitz, Hungary.

699. Auriferous Quartz, treated as "Stamp ore."
From the Haupt-gang, Kreuzberg, Nagy-banya, Hungary.

700. Auriferous Amethyst, and Zinc-blende.
Schemnitz, Hungary.
Presented by W. W. Smyth, F.R.S.

701. Native Gold, on quartz.
Csetatye, Vöröspatak, Transylvania.

702. Native Gold.
Vöröspatak, Transylvania.
Presented by G. B. Greenough, F.R.S.

703. Auriferous Sand.
Ural Mountains, Russia.
140 tons yield one pound, or 12 ounces troy, of gold.

704. Auriferous Sand.
Ural Mountains.
174 tons yield one pound troy of gold

705. Auriferous Sand.
Mines of Toulubinsk, Government of Perm, Ural Mountains.
190 tons yield one pound troy of gold.

706. Auriferous Sand.
Mines of Maryinsk, Ural Mountains.
213 tons yield one pound troy of gold.

707. Auriferous Sand, from which the gold has been separated by washing.
Mines of Maryinsk, Ural Mountains.

708. Auriferous Sand (Black Schlich), from which the gold has been separated by washing.
Mines of Maryinsk, Ural Mountains.

Shelf IV.

709. Native Gold.
Mines of Beresow, Uralian Mountains.
Nos. 703 to 709 presented by the Imperial Mining Institute of Russia.

710. Native Gold, mass of crystals.
Siberia.

711. Native Gold, several detached crystals.
Siberia.
Nos. 710 & 711 presented by Baron A. de Mayendorff.

712. Native Gold, cubic crystal.
New Grenada.

713. Native Gold, sample of stream or alluvial Gold.
California.

Ores of Platinum, &c.

714. Platiniferous Sand.
Mines of Yegoro-Kankrinskoï, Ural Mountains Russia.
140 tons yield from 1 to 5 troy pounds of platinum.

715. Platiniferous Sand.
Mines of Yegoro-Kankrinskoï, Ural Mountains.
140 tons yield from $1\frac{1}{2}$ to 3 troy pounds of platinum.

716. Native Platinum.
Mines of Taguil, Ural Mountains.

Nos. 714 to 716 presented by the Imperial Mining Institute of Russia.

717. Native Platinum.
Taguil, near the Ural Mountains, Siberia.

Presented by Baron A. de Mayendorff.

718. Native Platinum.
Nijnei Taguil, Siberia.

719. Native Platinum.
South America.

Presented by G. B. Greenough, F.R.S.

720. Iridosmine, or Osmiridium (*Iridium and Osmium*).
Nijnei Taguil, Siberia.

721. Iridosmine, occurring with Alluvial Gold.
California.

Presented by Professor Graham, F.R.S., Master of the Mint.

Ores of Tellurium.

The minerals of Tellurium are exceedingly rare, being limited throughout the world to a very few localities, of which the principal is the South-western part of Transylvania. They are extensively mined for there in consequence of the large proportion of gold which they contain.

722. Native Tellurium.

Presented by G. B. Greenough, F.R.S.

From the only locality, a now abandoned mine near Zalathna, Transylvania.

723 & 724. Black Tellurium, Nagyagite, or Blättererz (*Telluride of Lead and Gold*).
Nagyag, Transylvania.

725 & 726. White Tellurium, Graphic Tellurium, or Sylvanite (*Telluride of Silver and Gold*).
Offenbanya, Translyvania.

Ores of Mercury.

The total absence, as far as hitherto known, of all the ores of Mercury in Great Britain, renders it the more needful to exhibit a series of them from foreign countries. Several continental and American localities are represented by the following specimens, but besides the most noted mines of Almaden in Spain, Idria in Austria, and New Almaden in California, few of the other places have yielded notable quantities.

Shelf V.

727. Native Mercury.
Mine Vertrauen zu Gott, Landsberg, Germany.

Presented by the German Mining Company.

728, 729, & 730. Native Amalgam (*Silver and Mercury*).
Moschel, Middle Rhine, Germany.

731. Onofrite (*Selenide of Mercury*).
Tilkerode, Hartz.

732. Native Calomel (*Chloride of Mercury*).
Landsberg. Bavaria.

732 a. Horn Quicksilver (*Chloride of Mercury*), with Native Mercury and Cinnabar.
Moschel Landsberg, Deux Ponts, or Zweibrücken, Bavaria.

733. Cinnabar (*Sulphide of Mercury*), in a Micaceous Slate.
Ripa, Tuscany.

734. Cinnabar, in a vein of calcareous spar.
Tuscany.

735. Cinnabar, occurring as a rolled pebble.
Tuscany.

736. Cinnabar.
Castellazzare, Tuscany.

737. Cinnabar, veins in Grey-wacke Slate.
Idria, Carniola.

738 & 739. Cinnabar.
Deux Ponts, Germany.
Presented by G. B Greenough, F.R.S.

740 & 741. Cinnabar.
Almaden, Spain.
Presented by Don Casiano de Prado.

742. Cinnabar, in sandstone.
Almaden, Spain.

743. Cinnabar.
Almaden, Spain.

744 & 744a. Cinnabar.
Almaden, Spain.
Presented by Sir W. E. Logan.

745. Cinnabar.
California.

746. Cinnabar.
New Almaden, California.

747 & 748. Cinnabar.
California.
Nos. 746 to 748 presented by Dr. Bowring.

749. Cinnabar, with rich coloured Native Vermilion.
Los Frayles, Chañarcillo, Chile.
Presented by H. R. H. Prince Albert.

Shelf VI.

750 & 751. Cinnabar.

752. Cinnabar.
California.

753. Cinnabar.
California.
Presented by Dr. Forbes.

754. Cinnabar.
New Almaden, California.
Presented by Frederick A. Carrington.

Ores of Arsenic.

Native Arsenic, a mineral which has been found in small pieces at extremely rare intervals in some of our British mines, is frequently found associated with the rich silver ores of several foreign districts. But Arsenical Iron Pyrites, or Mispickel, and Lölingite (see p. 72) are the minerals commonly used for the production of Arsenic for commercial purposes.

The beautiful mineral Realgar, which when fresh exhibits a bright Aurora-red colour, decomposes so readily on exposure, that all the fine specimens presented to the Museum but a few years ago, will be found to have become yellow and powdery, and the valuable present, No. 761, is necessarily covered in order to avoid destruction by the light.

Shelf VII.

755. Native Arsenic, mammillated.
Andreasberg, Hartz.

756. Orpiment (*Tersulphide of Arsenic*).
Tajowa, near Neusohl, Hungary.

757. Native Realgar (*Bisulphide of Arsenic.*)
Nagyag, Transylvania.

758. Realgar, crystallized.
Nagyag.

759. Realgar, massive.
China.

760. Realgar.
China.
Presented by C. Button.

761. Realgar, worked into a vase by the Chinese.
Presented by Colonel Guthrie.

ILLUSTRATIONS OF LODES OR MINERAL VEINS.

Wall Cases 24 to 36.

The ores or metalliferous minerals seldom occur distributed in useful quantity through large masses of the rocks which compose the crust of the earth, but are found more or less concentrated in repositories of various form. These are, either beds or layers which bear evidence of having been made up, like the strata of earthy minerals, by the deposition of sediment from water, or they are repositories formed by the filling of cavities produced in the rock masses since their original consolidation. By far the more important of this latter class are the *lodes* or *mineral veins*, the sources of most of our ores of silver, copper, tin, and lead, of much of the gold, and some of the most valuable iron ores. Grouped here and there in numerous regions of the earth, and studied both for their power of producing wealth, and for the interest and beauty of their crystallized minerals, these repositories have for centuries been the subject of research and of philosophical speculation. Especially during the last eighty years has it been anxiously attempted by description and comparison of the phenomena observed in them, to reduce to rule and law the peculiarities and apparent anomalies of their occurrence and of their production of metallic contents.*

The notable connexion between the course or direction of the lodes and the minerals which they yield, as also the circumstances connected with the nature of the rocks which they traverse, require for their elucidation the aid of good geological maps on a large scale, but many of their varieties of structure, and most of the special appearances which mark epochs of change, and thus bear evidence to the principal events in their history, are capable of being illustrated by specimens. It is with this object that several cases in this museum are occupied with examples selected chiefly from our own, but partly from foreign mines; and since the lodes or veins, called after the several metals for which they happen to be worked, most usually exhibit a variety of different minerals associated together, and are subject more or less to the same phenomena of a structural kind, the whole of the specimens are arranged in one series, whether they are taken from veins which are called copper, silver, or lead lodes, according to the preponderance in value of one or other of these metals, or whether from veins in which two or more of them are found in available quantity.

A lode may be described as a mineral repository once a fissure, filled up with the products partly of mechanical and partly of chemical action. Whilst the average width of workable lodes may be from one to six feet, they occasionally attain as much as 60 or 100 feet, and in other instances are only a few inches, or, as in the case of certain tin and auriferous veins or "strings," no thicker than the blade of a knife. In no country probably can a vein be pointed out which contains but one single metallic mineral; if, for example, it be a silver lode, the

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* The names of Werner, von Weissenbach, Schmidt, Freiesleben, Bischof, Cotta, and W. Jory Henwood may be cited as some of the authors who have of late chiefly contributed by their works to our knowledge of these subjects.

ores of silver, or true silver minerals, are almost sure to be accompanied by some, though perhaps not a workable quantity, of the ores of lead or zinc, to say nothing of that ubiquitous, common-place, yet often beautiful associate of the other ores, Iron Pyrites. Certain districts are notable for the tendency of the veins to be small and comparatively rich, as for instance some of our Cornish granite regions with their "strings" and "branches" of tin-stone; but when the lodes attain greater power, or occupy a wider space between their walls, the filling will almost invariably be found to be of a mixed character, and to offer in different portions of their extension extremely variable appearances. Hardness and softness, poverty and riches, may suddenly succeed each other, or may, either of them, continue for long distances, with ever-changing phases of size, mineral, and colour, amid the complexity of which the adventurous miner must open the rocky ground inch by inch and fathom by fathom, basing his opinion, as long as the result remains uncertain, on the analogy of the phenomena under his eye with those which have been encountered elsewhere. It is thus that the structure of the matrix or body of the lode material, the particular association of minerals in it, and an infinite number of slight shades of physical variation, hardly capable of being expressed in words, interest alike the explorer maturing his judgment on the probabilities of success, and the philosopher studying the workings of Nature in these her remote and teeming laboratories.

Regular, well formed lodes may often be traced for a mile or two in length, some few, as in the Hartz, Hungary, and in Wales, as much as four or even eight or nine miles. Descending with an inclination more or less variable, they continue to the greatest depths to which man has attained, and are now working in the Fowey Consols Mines, Cornwall, at a depth of 340 fathoms from the surface, at Przibram in Bohemia at 370, and at Andreasberg in the Hartz at 420 fathoms, depths of which the clearest idea may be obtained when we remember that they represent the height respectively of ten and of twelve Monuments of London piled one on the top of the other.

The general traits of the simpler veins are well illustrated by the fissures of contraction which have taken place in the nodules of ironstone occurring so largely in the coal measures. Some of these, and particularly certain bands found in South Wales and in Derbyshire, exhibit the cracks sometimes partly open, and at others filled with minerals of subsequent introduction, among which are the carbonates of iron and lime, quartz, millerite, zinc-blende, galena, copper and iron pyrites. Crystals of the latter four sulphides, in the midst of what was once a sea sediment, and sometimes even attached to fossil remains, prove the formation of such compounds from watery solution. The series commences with a number of examples of this kind on a miniature scale, in Wall-case 24; and we pass thence to the strings or small veins which are formed for the most part of one simple mineral. Veins of this kind are seldom traceable for any considerable distance, and are commonly only subsidiary to, or connected in some way with, the stronger lodes of a district.

With the increased bulk of the regular lodes becomes also noticeable the prevalence of certain directions for those which contain the ores of particular metals;—thus E. and W., or E.N.E. and W.S.W. are the prevailing directions of the tin and copper lodes of Devon and Cornwall,

the lead lodes of Wales, Derbyshire and the North of England; N.E. and S.W. is that of the famous lead and silver lodes of Clausthal in the Hartz, Schemnitz in Hungary, and Linares in Spain. Those following the above directions are in some of our districts termed "right running veins," whilst occasionally another group coursing to a different point of the compass will also bear ores,—as with the "caunter" copper lodes of Cornwall, which bear E.S.E. and W.N.W. Those again which cross the first-mentioned at a great angle, and are thence termed cross-veins or "cross-courses," are very commonly quite barren, whilst in parts of Cornwall they are notable as carriers sometimes of iron ores and sometimes of richly argentiferous galena. In certain tracts, such as the Erzgebirge, or ore mountains of Saxony, several distinct groups of lodes have been proved to differ no less in their strike or direction than in the character of the minerals which they contain.

When followed, either horizontally or in depth, each single lode is found to be subject to the variations above-mentioned, as far as regards its size and the proportion of valuable contents. Thus the same lode, which in one district of the mine contains nothing but quartz, calcite, or barytes, (the "spars" of the miners) will elsewhere yield a goodly quantum of copper or of lead ore, or perhaps exhibit for a space scarcely anything else than a pure course of metalliferous minerals. Hence arise the sudden turns in the history of mines, the rapid influx of wealth, the uncertainty of its lasting, and the necessity for well managing the reserves and constantly farther exploring a lode that has been successfully opened upon in some part of its course. Many of the varieties of structure which are exhibited in the succeeding cases of the museum may happen to occur in different portions of the same vein. Two minerals confusedly crystallized together, in a manner not always very explicable by our present chemical knowledge, or one of them deposited at the sides of the lode upon the already consolidated crystals of the other mineral, these are some of the simpler appearances that present themselves. In Derbyshire, Cornwall, and Saxony beautiful specimens are produced, which indicate the succession of a number of crystalline minerals each placed afresh on an earlier crystallized surface. The banded or riband veinstone thus affords a chronology of the various substances forming it, which may now and then be only partially true, but which sometimes holds good for the whole vein or system of veins. Thus calc-spar and rich silver ores are apt to be the most recent of all the contents in the lodes of Freiberg, of Mexico, and the Southern Hartz.

Many peculiarities are coupled with the succession of the minerals; sometimes it is observable that the newer mineral coats or invests only the crystals of some particular substance previously formed, entirely avoiding others; or it will be found attached only to certain sides of the older crystals, as if it had been carried there by a current setting in a particular direction, or had been deposited under the influence of polar forces. The structure which our miners term "comby" gives proof, with its ranges of prismatic crystals shooting from the side towards the interior, that some of the veins have been rent open at several successive periods nearly along the same lines; it is especially observable in some of the iron-courses, along which there are other

reasons for concluding that great and repeated movements of the rock masses have taken place.

Another kind of structure is presented by the brecciated parts of lodes, where, as in the well-known breccia marble, angular fragments are cemented by a paste of another mineral. Most frequently such fragments are nothing else than pieces of the ruptured adjoining rock or "country," and thus fragments of clay-slate, black, blue, or grey, occur in the breccias of copper lodes in Cornwall, and of the lead lodes of Cardiganshire and the Tamar; granite, greenstone, and porphyry in those of Wicklow, Hungary, and parts of Cornwall. The material which has enveloped the fragments is sometimes one of the non-metalliferous kind, as barytes, quartz, or fluor, at others a metallic ore, as copper pyrites, oxide of tin, iron pyrites, galena, &c. Of these the museum possesses a very instructive series, thanks to the liberality of several of the Western mine owners and the attention bestowed on the subject many years ago by the late Sir H. De la Beche, C.B.

The fragments in a breccia, when they are evidently derived from an earlier consolidated lode, bear evidence corroborative of what has above been said on the repeated opening of the same lines of fracture in the earth's crust. The first stage, as it were, of this action is seen when a lode mass is broken irregularly or fissured across and the cracks are filled in and the broken parts held together by some newer mineral, often iron pyrites or zinc blende. In rarer instances the fragments have fallen farther away from their original places, and help to make up a lode in which the principal constituent may be the newer introduced matter.

Another special character is introduced into certain lodes by the tendency of particular minerals to form stalactites and stalagmitic incrustations. Calamine, asphalt, psilomelane and hydrous oxide of iron are among the most notable in this respect, and we may invite particular attention to the specimens from the large and interesting lode of Restormel, near Lostwithiel, which was visited and admired, underground, by Her Majesty and the late Prince Consort.

If farther evidence were required of the violent grinding action which has accompanied the formation of the lode fissures, it may be found in the *slickensides* or polished surfaces, which in certain veins run with the walls, especially in the hanging or upper side, but in others intersect variously the substance of the lode. Scored and grooved as they are in the direction in which sliding motion has taken place, they remind the collier of the slip-faces so often found in and about the faults or throws, where we have the most palpable proof of the descent of one side of a fissure relatively to the other.

It would be out of place in a brief introduction to do more than glance cursorily at the chemical changes which have taken place in the minerals constituting lodes, and of which the evidence consists principally in pseudomorphs, or mineral substances exhibiting a form foreign to themselves but characteristic of some other mineral whose place they have assumed. The false form may be a mere coating of one mineral by another, as of fluor spar by quartz, the latter thus appearing in cubes or octohedrons, figures in which it cannot crystallize: more frequently the internal mineral has been naturally removed, leaving the other as a thin crust. Into the hollows thus formed other substances have

been introduced, as in the "box-crystals" from the Virtuous Lady Mine. Many again have been produced by the gradual substitution, particle by particle, of one mineral for another, and a large group is traceable to the chemical action, which taking place under the admission of air and water, is naturally met with near the surface of the ground or in the shallower workings of the mines. This action it is which in many districts causes all the lead ore, found superficially, to be coated with or actually converted into cerussite (carbonate), anglesite (sulphate), or pyromorphite (phosphate); which has changed iron pyrites into brown oxide, and so decomposed the sulphuretted ores of copper that sometimes no copper mineral remains, whilst in others, oxides, arseniates, and carbonates bear testimony to the character of the metamorphosis.

It is in this latter group that we have to range the "gossan," that ferruginous mass which constitutes the upper part of most of the lodes, and from which the miner has often to judge, without seeing any actual ore, of the promise offered to his enterprize in depth. Under the name of the *eiserne Hut* (iron hat) it has been for centuries well known to the German miners; and on the continent as in Cornwall, the peculiar tints of brown and red, and the cellular character and lightness of the gossan are carefully noted and compared, and many a previously observed specimen has to contribute its results before an opinion can be formed on the value of a particular variety as indicative of a special metallic ore. The old miners' saying,

Es thut nie ein Gang so gut
Wann er trägt nicht ein' eisernen Hut,

has been translated into the language of the "bal," where grass signifies the surface of the ground,

A lode is never like to be fat,
If he carry at grass no iron hat.

A number of examples of gossan have been selected for the museum from particular mines, in which the workings having been pushed down through a few fathoms of this material have opened into enormous stores of wealth.

Lastly, a special phase of these chemical changes remains to be illustrated, viz., that in which the decomposition of the original ore is followed by the precipitation of a pure metal. Thus, native silver and copper are frequently found associated with gossan, and here and there an observant eye will detect the same kind of process obviously going on in connexion with some of the operations of the miner, as the iron ladder stave of a mine in St. Agnes entirely encrusted with metallic copper; portions of the pumps of a Cornish mine lined with a rich spongy deposit of the same metal; and a very curious conglomerate from the rubbish heaps of Wheal Leisure, in Perran, where copper has been thrown down amid a series of changes to which the original ores have been exposed. The metallic state, with copper especially, cannot be considered a condition of rest, it must be the commencement of a fresh series of alterations; and the brief series of specimens thus exhibited will satisfy the attentive inquirer, that the constant flux and

reflux, the ever-advancing change, decomposition, and re-construction which we see everywhere else in Nature, are, although slow and silent, not least remarkable in the depths of the mineral veins.

Illustrations of Lodes by the formation of Fissures and the Deposition in them of Minerals, in Clay Ironstones.

Wall-case 24.

Shelf I.

1. Clay, or Argillaceous Ironstone, of the Coal Measures, showing by its smooth surfaces two marked directions of cleavage, or joint-planes.

Saundersfoot, near Tenby, Pembrokeshire.

2. Clay Ironstone divided by similar joint-planes, but making oblique angles with each other.

Merthyr Tydfil, Glamorganshire.

These argillaceous carbonates of iron occur in beds or "courses" of a few inches thick, and partake of the jointed character of the rocks above and below them. Where, as in the following examples, the same substance occurs in nodular masses, they are frequently veined by cracks arranged more or less symmetrically, not visible at the surface of the stone, but sometimes occupying a large share of the interior.

3 and 4. Septarian nodule of Clay Ironstone, partly sliced and polished to show in the interior the cracks of contraction afterwards filled in with Calc-spar, cementing occasional angular fragments of the stone.

Shelf II.

5 and 6. Dark Limestone, polished.

From the Ecton Copper Mine, North Staffordshire.

Presented by the late J. Taylor, F.R.S. No. 5 shows in miniature the contortions of the limestone, which occur in parts of this mine on a great scale. No. 6 shows the strata of the same black limestone lying horizontally. Both masses are intersected by veins of calc-spar, which it will be observed are often subject to "squints," or small shifts in passing from one bed to the other. The mine was worked by the Duke of Devonshire to the depth of nearly 200 fathoms, and its great riches in copper were considered by local miners to be closely connected with the "saddles" in the limestone.

7, 8, 9, and 10. Pieces of the Ironstone called the "Spotted Vein," at *Merthyr Tydfil*, exhibiting in its cavities, along with pearl-spar and a few crystals of quartz, the rarer minerals Hatchettine, and Millerite, or Sulphide of Nickel.

11. Crystals of Galena, on Brown Spar, in casts of Anthracosia or Cardinia; illustrating the production of metallic sulphides by the wet way.

From the bed of ironstone belonging to the "Black Shale" rake, called the "Dun lining," Chesterfield, Derbyshire.*

12. Longitudinal Fissures of Contraction, partially filled with Zinc-blende and Brown Spar.

"Old Man" measure, Black Shale Ironstone, Chesterfield.

13. Section of the Stem of a Tree, of which the outer rind is converted into Bituminous Coal, showing open cracks of contraction in the interior.

Clay Balls Ironstone, Dudley, Worcestershire.

14. Fissures of Contraction, some of which are left unfilled, generally widest in the middle of the thickness of the nodule.

"Old Man" Ironstone, Black Shale Rake, Chesterfield.

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* For particulars of the characters and position of this very curious and productive group of ironstones, see the "Iron Ores of Great Britain," Part I., published among the Memoirs of the Geological Survey.

Shelf III.

15. Septarian Nodule of Clay Ironstone, the cracks partly filled with large crystals of Zinc Blende.
Wolverhampton.

16. Septarian Clay Ironstone, the cracks of which are only partly filled with Blende, Iron Pyrites, Spathose Iron, &c.
Wolverhampton, Staffordshire.

17 and 18. The two halves of a horizontally split nodule of Clay Ironstone, the cracks filled with Carbonates of Iron and Lime, and a little Blende and Copper Pyrites in the centre.
One of the "Cheeses" Ironstones, Black Shale Rake, Chesterfield.

19. Copper Pyrites, in minute crystals, on Brown Spar, in the cracks of the
Cheeses Ironstone, Chesterfield.

20. Copper Pyrites and Galena, with Brown Spar, in cavities of the
"Old Man" Ironstone, Chesterfield.

21. Zinc Blende, a group of brilliant crystals, in clay ironstone.
Cheese Measure, Hady, near Chesterfield.

22. Example of curvilinear Fissures of Contraction, with Galena and Brown Spar.
"Old Man" Ironstone, Chesterfield.

23. Example of curvilinear Cracks of Contraction, filled in with Blende and Calcite. This specimen of the "Balls" ironstone encloses, as not unfrequently happens, the stem of a fossil plant.
Wolverhampton, Staffordshire.

24. Angular Fragments of the Stone slightly cemented by Iron Pyrites to the sides of Fissures of Contraction.
"Old Man" Ironstone, Chesterfield.

25. Clay Ironstone, from the centre of a nodule, with crystallized Quartz, Siderite, and a fine twin crystal of Zinc Blende.
Ystalyfera, Swansea Valley.
Presented by Genl. Tremenheere.

Examples of Strings or narrow Veins composed chiefly of one Mineral.

Shelf IV.

26. Gangue or Vein-stuff of black indurated Clay, locally termed "Glauch," and occurring with the rich veins of Tellurium and Gold.
Nagyag, Transylvania.

27. Clay Slate ("killas") intersected by veins of Quartz, and these again by cross strings of black Tourmaline or Schorl.
Near the edge of the granite, at Carclaze, St. Austell, Cornwall.

28. Clay Slate, charged with Mica, and intersected by veins of Quartz.
From Carclaze, St. Austell, Cornwall.
Nos. 27 and 28 presented by W. W. Smyth, F.R.S.

29. Vein of Actinolite, with Epidote and Copper Pyrites.
Knockmahon Mines, Co. Waterford, Ireland.

30. Veins of Calc-spar traversing Serpentine: a polished specimen.
Lizard, Cornwall.

31. Veins of Barytes, intersecting sandstone (the upper millstone grit).
Wetley Moor, North Staffordshire.
Presented by W. W. Smyth, F.R.S.

32. Veins of Micaceous Iron Ore, traversing Sandstone.
Rio, Elba.
Presented by W. W. Smyth, F.R.S.

33. Illustration of the "squinting" of veins in passing through

dissimilar strata. Veins of CALC-SPAR traversing Limestone and Chert.

Ecton Mine, Staffordshire.

34. Illustration of the irregularities in veins, when traversing beds of different hardness and tenacity. Veins of CALC-SPAR, passing through Limestone and Chert.

Ecton Mine, Staffordshire.

35. String of COPPER PYRITES, with a little Quartz, traversing slate.

Consols Mines, Gwennap, Cornwall.

Shelf V.

36. Strings of COPPER PYRITES and Blende, mingled with Chlorite, traversing slate.

Binner Downs Mine, Crowan, Cornwall.

37. String of COPPER PYRITES, in Slate: smaller strings branch off from the main vein.

Huel Tolgus, Redruth, Cornwall.
Presented by John Michell.

38. String of COPPER PYRITES, traversing Slate. Exhibits the manner in which Copper Pyrites sometimes suddenly stops, and is replaced by Quartz, even in lodes of large size.

Huel Music, St. Agnes, Cornwall.

39. Very thin strings of CHLORITE ("Peach" of the miners), traversing green Fluor, in the copper lode of

Huel Unity Wood, Cornwall.

40. A string of dark PURPLE COPPER ORE, or Bornite, intersecting the mass of a mixed lode.

Huel Fortune, Marazion, Cornwall.

41. A string of COPPER PYRITES, traversing the general mass of a lode.

Consols Mines, Gwennap, Cornwall.

42. Vein of QUARTZ, the crystals meeting in the centre, tipped with Red Iron Ore, traversing Slate rock, with Copper Pyrites.

Great St. George Mine, Perranzabuloe, Cornwall.

43. Vein composed of Quartz, Calcite, Epidote, &c., showing a deposition of the parts *obliquely* across the vein.

West of Dane's Island, near Bonmahon, Waterford, Ireland.

44. Vein of FLUOR alone traversing grey beds of carboniferous limestone.

Cockwell Mine, Ashover, Derbyshire.

Shelf VI.

45. Vein of STEATITE, traversing serpentine rock.

Near Black Head, St. Keverne, Cornwall.

46. HÆMATITE, filling the cracks of a chalk flint.

Orleigh Court, Bideford, Devonshire.

47. String of very crystalline CASSITERITE, or Oxide of Tin.

St. Austell, Cornwall.

48. Vein of QUARTZ, intersecting "killas" or clay slate, from a Tin Mine.

St. Agnes, Cornwall.

49. Poor strings of COPPER PYRITES traversing pink granite.

Cornwall.

Shelf VII.

50. Strings of COPPER ORE (Sulphide and Black Oxide), traversing white "killas" or clay slate, from very rich shallow parts of the workings,

Great St. George Mine, Perranzabuloe, Cornwall.
Presented by H. Humphries.

51. Very irregular strings of COPPER PYRITES, traversing dark killas.

Fowey Consols, St. Blazey, Cornwall.
Presented by the late J. Austen Treffry.

51a. Vein of black Schorly Capel (a mixture of Schorl and Silica), intersecting granite.
Redruth, Cornwall.
Presented by the late J. Garby, 1863.

Wall-case 25.

Shelf I.

52. Branch of Cassiterite, or Tin Ore, traversing granite.
Near St. Enoder, Cornwall.
Presented by R. Davey, M.P.

53. Strings of Galena, traversing limestone and grit.
Aldstone Moor, Cumberland.

54. Strings of Copper Pyrites in Elvan.
Chasewater Mine, Cornwall.
Presented by Sir H. T. De la Beche.

55. Blende, very thin strings or veins, in sandstone, with Fluor-spar.
Grassington Lead Mines, near Skipton, Yorkshire.
Presented by the late Captain S. Eddy.

Shelf II.

56 & 57. Strings of Argentiferous Galena, traversing slate.
Goginan Mine, Cardiganshire.

57a. String of crystallized Tin-stone, in a Granite rock, through which the same mineral is also disseminated.
St. Austell, Cornwall.

58 & 59. Strings of Stanniferous Schorl, traversing white Elvan.
St. Austell, Cornwall.

Shelf III.

60. String of Copper Pyrites, traversing the body of the Lode.
Tresavean Mine, Cornwall.

61. Tin-stone, or Cassiterite, disseminated through Granite.
Morley Clay Works, Plympton, Devonshire.
Presented by the late Dr. Buckland.

62. Strings of Copper Pyrites, traversing Killas (clay-slate), which at the edges shows the colouring effect produced through the veins.
Huel Edward, Calstock, Cornwall.
Presented by W. W. Smyth, F.R.S.

63. Strings of Tin Ore, in dark slate.
Polberro Mine, St. Agnes, Cornwall.

64. Strings of Argentiferous Galena, traversing felspar-porphyry.
Graigwen Mines, Dinas Mowddwy, North Wales.

Shelf IV.

65. String of Galena, from the silver-lead lode,
Daren Mine, Aberystwith, Cardiganshire.
Presented by Captain John Paull.

66. Argentiferous Galena, in irregular ramifications through talcose slate.
Serravezza, Tuscany.

67. String of Bornite and Copper Glance, in a lode.
Huel Alfred, Hayle, Cornwall.

68. Crystallized Cassiterite, being one side or cheek of the vein.
Beam Mine, St Austell, Cornwall.

69. Phosphorite (Phosphate of Lime), from a vein, showing its deposition in successive layers, yet crystalline throughout.
Logrosan, Estremadura, Spain.
Presented by Professor Daubeny, of Oxford.

70. Branch of Cassiterite or Tin-stone, with Quartz, traversing granite.
Balleswidden Mine, St. Just, Cornwall.

71. Cassiterite, in minute veins intersecting Elvan or granitic porphyry.
Parabola Mine, Gwinnear, Cornwall.
Presented by the late J. Garby.

Shelf V.

72. Strings of Tin Ore, traversing granite.
Balleswidden Mine, St. Just, Cornwall.

73. Strings of Cassiterite, in Elvan.
St. Agnes, Cornwell.

74. Strings of Cassiterite, traversing Slate.
Polberro, St. Agnes, Cornwall.
Presented by J. S. Enys, F.R.S.

75. Part of a lode of Galena.
Lisburne Mines, Aberystwith, Cardiganshire.
Presented by the late Captain J. Eddy.

76. Cassiterite, disseminated in Granite.
Tin Lode, Morley Clay Works, Plympton, Devon.
Presented by the late Dr. Buckland.

77. Cinnabar (Sulphide of Mercury), occurring in strings in micaceous slate.
Ripa, Tuscany.

Shelf VI.

78. Copper Pyrites, disseminated in strings in Granite.
Huel Vyvyan, Constantine, Cornwall.

79. Example of the junction of a Copper lode and a Granite wall, the separation being not very distinct.
Huel Jewel, Gwennap, Cornwall.

80. Portion of a lode of Copper Pyrites.
Berehaven Mine, County Cork, Ireland.

Shelf VII.

81. Strings of Cassiterite or Tin-stone, traversing killas or Clay slate.
Polberro Mine, St. Agnes, Cornwall.

82. Portion of a Tin Lode, showing the mode in which some of the Cornish and Devon tin lodes occur in granite, the lode itself being of a granitic character.
Balleswidden Mine, St. Just, Cornwall.

83. Portion of a lode of Argentiferous Galena.
Goginan Mine, near Aberystwith, Cardiganshire.
Presented by G. Fosset.

Wall-case 26.

Shelf I.

84. Exhibits junction of a Copper lode and a Granite wall.
Wheal Jewel, Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

85 & 86. Portions of a Tin Lode.
Tredavoe Mine, St. Paul, Cornwall.
Presented by the late Sir H. T. De la Beche.

87. Part of a Tin Lode. This lode is remarkable for the manner in which the crystals of tinstone, felspar, and quartz occur in it.
Tredavoe Mine, Penzance.
Presented by Sir H. T. De la Beche.

Shelf II.

88. Copper Pyrites and Calcareous Spar.
Great Orme's Head, Caernarvonshire.

89. Argentiferous Galena.
Ruplagh Lode, in Granite, Luganure, Co. Wicklow, Ireland.
Contributed by the Irish Geological Survey.

90. Portion of an Argentiferous Lead Lode.
Cwm Symlog Mine, near Aberystwith, Cardiganshire.
Presented by Captain Reed.

91. Portion of a Lode containing Blende, or Sulphide of Zinc.
Nant-y-Creiau Mine, Aberystwith, Cardiganshire.
Presented by R. Bincks.

92. String of NATIVE COPPER, in the lode,
Treskerby Mine, Cornwall.
Presented by G. Croker Fox.

93. Branch and Strings of PEROXIDE of TIN, in Elvan.
St Austell, Cornwall.
Presented by Sir H. T. De la Beche.

94. Strings of GALENA, in Calcite.
From the "Red Vein," Feedonald, Strontian, Argyleshire.
Presented by Sir J. M. Riddell, Bart.

95. Vein of QUARTZ, partly amethystine.
St. Just, Cornwall.

96. Part of a TIN LODE, exhibiting a conformity of arrangement in one or two places, as if crystals of quartz being formed, tin ore and felspar arranged themselves according to the planes of the quartz crystals.
Trevadoe Mine, St. Paul, Cornwall.
Presented by Sir H. T. De la Beche.

97. Branch of TIN ORE.
Huel Vor, Breague, Cornwall.
Presented by Sir H. T. De la Beche.

Shelf III.

98. Strings of GALENA, in Magnesian beds of mountain limestone.
Dutchman's Vein, Ecton, Staffordshire.

99. String of COPPER PYRITES, in calcareous spar.
Gravel Mine, Bishop's Castle, Shropshire.

100. Branch of TIN ORE in slate.
Drakewalls Mine, Calstock, Cornwall.
Presented by Sir H. T. De la Beche.

101. LODE composed of Chlorite and Copper Pyrites, exhibiting well the sharp severance of the laminæ of clay slate which forms the wall of the lode.
From the 112 fathoms level, East Crinnis, Cornwall, 1855.

102. A String of SULPHIDE of SILVER, in sulphate of baryta.
Mines of Zmeïnogorsk, Altai, Russia.
Presented by the Imperial Mining Institute of Russia.

103. Strings of COPPER PYRITES, traversing Hæmatite.
Huel Trenwith, St. Ives, Cornwall.

104. Part of a TIN LODE.
Balnoon, St. Ives, Cornwall.
Presented by Sir H. T. De la Beche.

105. Part of a COPPER LODE, adjoining one of its walls.
North Roskear Mine, Camborne Cornwall.
Presented by John S. Enys, F.R.S.

Shelf IV.

106. Strings of COPPER PYRITES, in Magnesian beds of Carboniferous Limestone.
Dutchman's Vein, Ecton, Staffordshire.

107. Strings of TINSTONE, or Peroxide of Tin, in Granite.
Wheal Vyvyan, Constantine, Cornwall.
Presented by Sir H. T. De la Beche.

108. Branch of PEROXIDE of TIN, traversing slate, which as in No. 62 is discoloured on both sides of the vein.
Drakewalls Mine, Calstock, Cornwall.
Presented by Sir H. T. De la Beche.

109. Strings of QUARTZ, with Sulphide and Carbonate of Copper.
Rattlinghope, near Bishop's Castle, Shropshire.

110. String of WOLFRAM in Granite.
St. Michael's Mount, Cornwall.
Presented by Sir H. T. De la Beche.

111. Vein of LÖLINGITE, or Arsenical Iron (Arsenide of Iron), in Serpentine.
Reichenstein, Silesia.

112. Part of a LODE worked for Tin, the tin-stone being the only metallic substance.
St. Austell Hill Mines, St. Austell, Cornwall.

113. String of GALENA, in Greenstone.
Llyn Pen-craig Mine, Bettws-y-Coed, Llanrwst, North Wales.

Shelf V.

114. Cubic crystals of GALENA, dispersed through a part of the lode.
Nant-y-Creiau Mine, near Aberystwith, Cardiganshire.
Presented by R. Bincks.

115. GALENA, associated with Magnetic Iron Pyrites.
Smittergill Head, Aldstone, Cumberland.

116. BLENDE and GALENA.
Nant-y-Creiau Mines, Aberystwith, Cardiganshire.
Presented by R. Bincks.

117. GALENA, in isolated cubic crystals.
Bettws-y-Coed, North Wales.

118. Branch of TIN-STONE, or Peroxide of Tin, traversing Granite.
Trevadoe Mine, Worleggan, Cornwall.
Presented by Captain Richard.

119. Branch of PEROXIDE of TIN, partly crystallized.
Wheal Pye, St. Agnes, Cornwall.

120. String of TIN-STONE and disseminated Tin Ore, in granite rock.
St. Austell, Cornwall.
Presented by Sir H. T. De la Beche.

121. CALCITE, or Carbonate of Lime, well crystallized as trihedral prisms in a vuggy cavity in the Lead Lode of *Huel Wrey, near Liskeard, Cornwall.*

Shelf VI.

122. Coating of IRON PYRITES, on part of a copper lode.
Wheal Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

123. Vein of TIN-STONE, in Gneiss.
Geyer, Saxony.

124. String of ARGENTIFEROUS GALENA, with Zinc Blende.
Mexico.

125. CRYSTALLIZED GALENA, part of a rich bunch of lead in limestone.
South Wales.

126. Veins of GALENA, in Sandstone.
Grassington Lead Mines, near Skipton, Yorkshire.
Presented by the late Captain S. Eddy.

Shelf VII.

127. MINE TIN ORE, the constituents being white Quartz, black Capel, and a rich proportion of Oxide of Tin.
Charlestown Mines, St. Austell, Cornwall.
Presented by Captain Barratt.

128. Large portion of a COPPER LODE, exhibiting the manner in which the Copper Pyrites is mingled with the other contents of the lode, and illustrating the mode of occurrence in many lodes in Cornwall.
Great St. George Mine, Perranzabuloe, Cornwall.
Presented by Henry Humphries.

129. Junction of a COPPER LODE and Granite Wall, the separation being very distinct.
Wheal Jewel, Gwennap, Cornwall.
Presented by the late John Williams.

Portions of Lodes consisting chiefly of two Minerals.

Wall-case 27.

Shelf I.

130. Branch of Tin Ore, in granite; Tin-stone with colourless Quartz.
Boswedden Mine, St. Just, Cornwall.
Presented by Sir H. T. De la Beche.

131. Crystalline mixture of Fluor Spar and Sulphate of Baryta, forming the vein stone of a large east and west lead lode.
Bonsal leys, Derbyshire.

132. Granular-crystalline aggregation of Fluor Spar and Sulphate of Baryta, filling an east and west lead lode.
Bonsal leys, Derbyshire.

133. Galena and Sulphate of Baryta, in successive depositions.
Near Buxton, Derbyshire.

134. Rib of Argentiferous Galena, containing 138 ozs. Silver to the ton; along with grey Quartz in granite country.
From the 60 fathoms level, Old Foxdale Mines, Isle of Man.
Presented by M. W. Beckwith.

135. Crystallized Galena, with Fluor Spar, both encrusted with Sparry Iron Ore, or Carbonate of Iron.
Allenheads, Northumberland.

136. Copper Pyrites, with calc-spar, raising in October 1850, from the Black Limestone, at 30 fathoms open.
Ecton, Staffordshire.

Examples of Lodes composed of several different Minerals.

Shelf II.

137. A vein of Cassiterite, or Peroxide of Tin, in Mica, running through granite.
Zinnwald, Bohemia.

138. Argentiferous Galena, Copper Pyrites, and Quartz.
Glenmalur, Co. Wicklow, Ireland.
Contributed by the Irish Geological Survey.

139. Crust of Quartz, originally deposited on Fluor Spar, which has since disappeared, leaving the impression of its cubical crystals. The Quartz has afterwards been nearly covered by the deposition of crystals of Zinc Blende, or Sulphide of Zinc.
From the lead-bearing veins of Nenthead, Cumberland.

140. Calcareous Spar, in scalenohedral crystals, part of them invested by purple Fluor Spar.
Ecton Mine, Staffordshire.

141. Veinstone, showing the incrustation of cubical crystals of Argentiferous Galena, with Sparry Iron Ore and Iron Pyrites.
Allenheads, Northumberland.

142. Copper Pyrites and Carbonate of Iron.
Part of the Lode of Virtuous Lady Mine, Tavistock, Devonshire.
Presented by Sir H. T. De la Beche.

142a. Tin Stone, or Cassiterite (peroxide of tin), with Red Oxide and Green Carbonate of Copper.
Near St. Day, Gwennap, Cornwall.

143. Crystallized Peroxide of Tin, in a joint or cleavage of granite filled with tin ore, quartz, and mica.
St. Michael's Mount, Cornwall.
Presented by Sir H. T. De la Beche.

144. Crystallized Tin Ore, with Mica, and Quartz, lining one side of a joint in granite.
St. Michael's Mount, Cornwall.
Presented by Sir H. T. De la Beche.

144a. String of Blende, with Fluor and Quartz, in slate.
St. Agnes, Cornwall.
Presented by Sir H. T. De la Beche.

Shelf III.

145. Galena, with Calcareous Spar.
A portion of the Hero Lode, Glendasane, Co. Wicklow, Ireland.
Contributed by the Irish Geological Survey.

146. Lead Vein, with Toadstone Wall attached.
High Rake deep shaft, Tideswell, Derbyshire, 1850.
This specimen offers interest as being an exception to the rule commonly received in Derbyshire that the veins die away in, or are cut out by the Toadstone.

147. Galena, with Sulphate of Baryta.
Great copper deposit, Ecton, Staffordshire.

148. Galena, occurring in spots or "blanches" in Fluor Spar.
Smittergill Head, Aldstone, Cumberland.

149. Sulphide of Silver, and Quartz, illustrating the filling up of the vein.
Schemnitz, Hungary.

150 & 151. Branch of Copper Ore, traversing Slate. These specimens show that the cavity containing the branch was first lined by quartz on one side, and clayey matter and quartz on the other, before Copper Ore was introduced into the fissure.
Wheal Fortune, Marazion, Cornwall.
Presented by Sir H. T. De la Beche.

152. Branch of Copper Ore, traversing Slate.
Huel Fortune, Marazion, Cornwall.
Presented by Sir H. T. De la Beche.

Shelf IV.

153. Tin Ore.
Wheal Vor, Breague, Cornwall.
Presented by John Sylvester.

154. Galena, the crystals on one side covered with Quartz.
Nant-y-Creiau Lead Mine.
Presented by R. Bincks.

155. Barytes and Galena, encrusting Calc Spar.
Crich Mines, Derbyshire.

156. Radiated Barytes and Green Fluor.
Trehane Mine, near Liskeard, Cornwall.

157. Crystalline Göthite, or Hydrous Peroxide of Iron, deposited on Red Peroxide of Iron, and overlaid by crystallized Quartz, forming a "vug" or cavern.
Restormel Royal Iron Mine, Lostwithiel, Cornwall.

158. Crystals of Göthite, invested with Quartz. An example of entire coating by a crystalline film of a newer mineral.
Restormel Royal Iron Mine, Cornwall.

158a. Calcite, in white sheaf-like groups of crystals, attached to Iron Pyrites in pseudomorphous incrustations.
Liskeard, Cornwall.

Shelf V.

159. Blende, variety "Black Jack," crystallized on Quartz.
Old Hagg's Vein, Aldstone Moor, Cumberland.

160. Tabular crystals of Barytes, partially encrusted with cubic crystals of Iron Pyrites.
E. Cornwall.

161. Octohedral crystals of Galena, partially covered with crystallized Quartz.
Aldstone, Cumberland.

162. Crystals of Copper Pyrites on Quartz.
Cornwall.

163. Fluor Spar, with crystals of Galena, superficially decomposed.
Durham.

164. Copper Pyrites, Specular and Spathose Iron Ore, with Fluor Spar.
Carn Brea Mines, near Redruth, Cornwall.
Presented by the late John Garby.

165. Galena, in cubo-octohedral crystals, with Fluor Spar, Pearl Spar, and Iron Pyrites.
Durham.

Shelf VI.

166. Part of a Copper Lode, showing the character of the lode adjoining one of its walls or sides, composed of killas, or clay-slate.
Wheal Friendship, Tavistock, Devon.
Presented by Sir H. T. De la Beche.

167. Part of a Copper Lode, showing a plate of Copper Pyrites between two plates of Tin Ore.
Wheal Vyvyan, Constantine, Cornwall.
Presented by Sir H. T. De la Beche.

168. Part of a Copper Lode, containing a mixture of Copper and Iron Pyrites, and showing a very cavernous or "vuggy" part of the Lode.
Trewarvas Mine, Trewarvas Head, Cornwall.
Presented by Sir H. T. De la Beche.

169. Junction of a Copper Lode, and a Granite Wall, the separation of the Lode from the Wall not being very distinct.
Wheal Jewel, Gwennap, Cornwall.
Presented by John Williams.

170. Junction of a Copper Lode and a Granite Wall. Lode and Wall not very distinct.
Carn Brea Mine, Redruth, Cornwall.
Presented by Sir H. T. De la Beche.

171. Vein of Quartz, Calcareous Spar, and Epidote, cutting through Greenstone rock.
Knockmahon Mines, Co. Waterford, Ireland.
Contributed by the Geological Survey.

Shelf VII.

172. Vein Specimen, showing the deposit (1.) of Quartz several times in succession, (2.) of Fluor Spar, and (3.) of Copper Pyrites.
Cornwall.
Presented by R. W. Fox, F.R.S.

173. Part of a Copper Lode, exhibiting the character of part of the Lode near one of its sides or "walls."
Wheal Friendship, Tavistock, Devon.
Presented by Sir H. T. De la Beche.

174. Vein of Galena, with Calcareous Spar.
Alport Mines, Derbyshire.

Wall-case 28.

Shelf I.

175. Part of a Copper Lode, containing Copper Pyrites and crystallized Iron Pyrites.
Trewarvas Mine, Cornwall.
Presented by Sir H. T. De la Beche.

176. Part of a Copper Lode, showing its character near one of its sides or walls.
Wheal Jewel, Gwennap, Cornwall.
Presented by the late John Williams.

177. Mixed Copper Pyrites, Arsenical Pyrites, and Blende, adjoining the wall of a Lode.
Wheal Jewel, Gwennap, Cornwall.
Presented by the late John Williams.

178. Galena, occurring in spots or "blanches" in Fluor Spar, with Quartz.
Smittergill Head, Cumberland.

179. Galena, with Sulphate of Baryta and Calcareous Spar.
Moletrap Mine, Cromford, Derbyshire.

Shelf II.

180. Portion of a small Tin Lode, consisting of white nacreous Mica, Quartz, and rough Tin-stone.
Huel Pye, St. Agnes, Cornwall.

181. Part of a Copper Lode.
Virtuous Lady Mine, Tavistock, Devon.
Presented by Captain John Williams.

182. Portion of a Copper Lode, near one of its walls. An example of a platy or "comby" lode: nearest the wall Quartz, then Blende, afterwards Iron Pyrites.
Wheal Tolgus, Redruth, Cornwall.
Presented by John Michell.

183. Strings of Copper Pyrites, traversing Elvan.
Consols Mine, Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

184. Portion of the Lead Lode, with Schiefer Spar, or lamellar carbonate of lime, in granite.
Luganure, County Wicklow, Ireland.

185. Crystals of Galena, deposited on Fluor, and the surfaces much encrusted.
Cumberland.

186. Radiated Blende, in spheroidal groups, enveloped in quartz.
Pen-y-Cefn Mine, Cardiganshire.
Contributed by the Geological Survey.

187. Fluor Spar and Galena, the crystals successively coated by Quartz, Zinc Blende, and Quartz.
Aldstone, Cumberland.

Shelf III.

188. Crystallized Carbonate of Iron, dotted with minute crystals of Childrenite (Hydrous Phosphate of Alumina and Iron).
Tavistock, Devon.

189 and 190. Galena and Coal, from a small lode of considerable regularity, in the lower Coal Measures.
Whaley Bridge, 6 miles N. of Buxton, Derbyshire.
Presented by T. Gisborne, M.P.

191. Sample of a vein of Grey Copper Ore.
Berehaven Mines, County Cork, Ireland.

192. A vein of Grey and White Arsenical Cobalt.
Schneeberg, Saxony.

193. Copper Pyrites and Fluor Spar, mingled in a lode.
Wheal Unity Wood, Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

Shelf IV.

194. Fine Scalenohedral Crystals of Calcareous Spar, enclosing Copper Pyrites, and proving the simultaneous crystallization of the two minerals.
Clayton Main, Ecton, Staffordshire.
Presented by Captain Bonsal.

195. Zinc Blende, or Sulphide of Zinc, on quartz and limestone.
Aldstone Moor, Cumberland.

196. Copper Pyrites, commingled with Crystalline Galena.
Tuscany.
Presented by the Tuscan Commissioner, 1851.

197. Section of a Lode, showing that Quartz Crystals were first deposited upon the Wall, and then upon them Oxide of Tin, and the vein subsequently filled up with massive Quartz.
St. Just, Cornwall.

198. Part of a Tin Lode containing "toads eye" tin.
Near Penzance, Cornwall.
Presented by the late Joseph Carne, F.R.S.

199. Successive depositions of (1.) Red Iron Ore, or Hæmatite; (2.) Dark Brown Iron, or Göthite; (3.) Light Brown or "Wood Iron;" and (4.) Ferruginous Quartz.
From the Lode at the Restormel Royal Iron Mine, Lostwithiel, Cornwall.

200. Successive deposition of (1.) Red Oxide of Iron; (2.)

Göthite; (3.) "Wood Iron;" and (4.) Pyrolusite, or Binoxide of Manganese.

Restormel Lode, Lostwithiel, Cornwall.

200a. Francolite, a variety of Apatite (Phosphate of Lime), crystallized upon a thin film of ferruginous Quartz coating two successive deposits of opaque Quartz.

From the Copper Lode of Fowey Consols, St. Blazey, Cornwall.

Shelf V.

201. Slab of "Rosin Tin." The entire thickness of a small vein in which the Tin-stone is mingled only with a little Quartz and Schorl.

From the 25 fathoms level, Vounder Lode, West Par Consols St. Blazey, Cornwall.

202. Small veins of Galena, locally termed "Skrins," in hard limestone.

Long Tor, Matlock Bath, Derbyshire.

203. Unusually rich example of a Copper Lode, containing native copper, red and black oxides, and sulphide of copper.

Great Saint George Mine, Perranzabuloe, Cornwall.

Presented by Henry Humphries.

203a. Quartz veinstone studded with Carbonate of Iron and Lime, and this again with Magnetic Pyrites in six-sided plates.

From the Morro Velho Gold Mine, Brazil.

Presented by John Hockin, 1861.

Examples of Lodes composed of various Minerals deposited in regular succession.

Wall-case 29.

Shelf I.

204. Galena, with Calc Spar and Fluor.

From the deposits termed "Flats"; in the Great Limestone at Allenheads, Northumberland.

205. Veins of Galena and Calc Spar.

White Grit Mine, Shropshire.

206. Hæmatite, or Red Oxide of Iron, and Quartz.

Huel Cock, St. Just, Cornwall.

Presented by Sir H. T. De la Beche.

207. Galena, with Iron Pyrites and Limestone.

Nent Head, Aldstone Moor, Cumberland.

Shelf II.

208. Branch of Silver Ore.

Biscania Vein, Terreros, Real del Monte, Mexico.

Presented by the late John Taylor, F.R.S.

209. Galena, Blende, Pyrites, and Calc Spar: "Banded vein stuff:" the arrangement of the crystalline portions peculiarly radiated.

Cwm Eisen, or Cwm-y-swm, Western Mine, Merionethshire.

210. Galena, Blende, Iron Pyrites, and Calc Spar.

Cwm-y-swm Mine, Dolgelly, Merionethshire.

211. Veins of Galena, in Limestone.

Cromford, Derbyshire.

Presented by Sir H. T. De la Beche.

212. Portion of a Lode, showing successive depositions of Galena and Blende.

Nant-y-Creiau Mine, Cardiganshire.

213. Silver Lode, containing Arsenical Silver, Galena, and Carbonate of Manganese.

Bescheert Glück Mine, near Freiberg, Saxony.

214. Part of a Lode, showing the fissure to have been partly filled with Blende, then with Galena, and finally with a String of Quartz.

Nant-y-Creiau Lead Mine, Aberystwith, Cardiganshire.

Presented by R. Bincks.

215. Part of a Lead Lode.

Fox Rock Mine, Glendasane, Co. Wicklow, Ireland.

Contributed by the Irish Geological Survey.

Shelf III.

216 and 217. Galena, Fluor Spar, and Sulphate of Baryta: (polished specimens).

Crich, Derbyshire.

Presented by Sir H. T. De la Beche.

218. Successive depositions of Fluor, Barytes, and Iron Pyrites, in a Lode.

Crich, Derbyshire.

219. Galena, Brown Iron Ore, and Quartz.

Wheal Rose, Helston, Cornwall.

220. Vein of Calc Spar, showing many successive additions in parallel planes.

From the Carboniferous Limestone at Sally Moor, Weaver Hills, Staffordshire.

221. Quartz, invested with a crust of crystallized Iron Pyrites.

Herodsfoot Mine, E. Cornwall.

222. Vein formation, showing succession of Fluor Spar with Galena, Carbonate of Iron, Green Fluor, and Quartz.

Stanhope Burn, Weardale.

Presented by W. W. Smyth, F.R.S.

223. Successively deposited strings of Barytes and Galena.

Brassington, Derbyshire.

224. Veins of Iron Pyrites, Galena, Blende, and Quartz.

Cwm-y-swm Mines, near Dolgelly. Merionethshire.

Shelf IV.

225. Part of a Lode, showing plates or layers of Quartz and Iron Ore, with Copper Pyrites on one of the former.

Wheal Cock, St. Just, Cornwall.

Presented by Sir H. T. De la Beche.

226. Matrix of Copper Lode, containing Quartz, Epidote, and Calcareous Spar, with fragments of the adjoining rock of serpentinous greenstone.

Knockmahon Mines, Co. Waterford.

Contributed by the Irish Geological Survey.

227. Rich Silver Lode, containing White Silver, Galena, Iron Pyrites, and Brown Spar.

Nimdich in Acht, Freiberg, Saxony.

228. Orthoclase Felspar, intermingled with Quartz,

In the Lode of Cowarch Lead Mine, Dinas Mowddwy, N. Wales.

229. Successively crystallized ribs of Calc Spar.

From a vein, Halkin Mountain, Flintshire.

230. Part of a Copper Lode, poor for copper, but showing regular ribs of Zinc Blende and Quartz.

Great Work, Breague, Cornwall.

Presented by John Sylvester.

231. Veinstone, with Galena, Copper Pyrites, &c.

From shallow workings on the main East and West Lode, Ecton, Staffordshire.

Shelf V.

232 and 233. Veinstone, showing riband structure, or numerous alternating deposits of Quartz, Galena, Heavy Spar, Iron Pyrites, and Blende.

From the Mine Churprinz Friedrich August, near Freiberg Saxony.

Presented by Ernest Dolby.

234. Part of a COPPER LODE or vein, exhibiting the structure called "comby."
Consols Mine, Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

235. Veins of GALENA, alternating with Pyrites, Calc-spar, and earthy Barytes.
Cromford, Derbyshire.

236. Ferruginous and clear varieties of CALC SPAR, &c., in successive deposits.
"Vein stuff," Pant-y-neh Vein (N. & S. Lode), Holywell, Flintshire.

237. PHOLERITE ? radiated from Zinc Blende crystals, in "Whitestone" Ironstone.
Russell's Hall, Dudley.

238. Branch of SILVER ORE and QUARTZ.
Biscania Vein, Real del Monte, Mexico.
Presented by the late John Taylor, F.R.S.

239. ARGENTIFEROUS GALENA, BLENDE, and CARBONATE OF IRON.
Lead Lode of Barristown, Co. Wexford, Ireland.
Presented by R. Hunt, F.R.S.

240. Regular Ribs of GALENA and BARYTES, with yellow Fluor, forming part of a Lead Lode.
Basore Mine, Kenwyn, Cornwall.

241. ZINC BLENDE, with fossil impressions, from the Carboniferous Limestone.
Water Bank Mine, Ecton, North Staffordshire.

242. "Comby" or "Platy" part of one of the LODES,
Fowey Consols, St. Blazey Cornwall.

Shelf VI.

243. GALENA and BLENDE.
Caegwernog and Berthllwyd Silver Lead Mines, Dolgelly, Merionethshire, N. Wales.
Presented by the late James Harvey.

244. Specimen of LODE from the shallow workings.
Main Ecton Lode, E. and W. Ecton, Staffordshire.
Presented by W. W. Smyth, F.R.S.

245. Part of a COPPER LODE.
Huel Julia, Crowan, Cornwall.
Presented by Sir H. T. De la Beche.

246. STEELY-GRAINED GALENA, with Quartz and Pyrites, showing the full breadth of a small lode or branch.

247. COPPER PYRITES and BLACK OXIDE OF COPPER.
Devon and Courtnay Mine, near Tavistock, Devonshire.

248. Part of a COPPER LODE, containing stripey fragments of dark killas, parted from the wall.
Huel Jane, Helston, Cornwall.
Presented by Sir H. T. De la Beche.

249. SILVER LODE, containing Galena, Iron Pyrites, Arsenical Pyrites, Brown Spar, and Quartz.
Simon Bogner Neuwerk Mine, near Freiberg, Saxony.

Shelf VII.

250. Part of a COPPER LODE, containing plates of Quartz and Copper Pyrites.
Wheal Tolgus, Redruth, Cornwall.
Presented by John Michell.

251. GALENA, Blende, and Iron Pyrites.
Cwm-y-swm Mine, near Dolgelly, Merionethshire, North Wales.
Presented by the late James Harvey.

252. Specimen stone containing GALENA, ARGENTIFEROUS FAHLERZ, CADMIFEROUS BLENDE, and CALCITE. The Galena, when dressed, yields 82 per cent. of lead, and 330 ounces of silver to the ton.
From the 18th level, 246 Viennese fathoms deep in the Adalbert Lode, Przibram, Bohemia.
Presented from the International Exhibition, 1862, by the Imperial Mining Department of Przibram.

WALL-CASE 30.

Shelf I.

253. Part of a COPPER LODE or Vein, exhibiting the structure termed "comby."
Consols Mine, Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

254. Parallel ribs of Galena, Quartz, and Carbonate of Iron.
Helston, Cornwall.

255. Ribs of Carbonate of Iron, Chlorite, Quartz, and Copper Pyrites.
Cornwall.

256. Veins of Blende, Carbonate of Iron, and Iron Pyrites.
Llyn-y-Parch, Bettws-y-Coed, Caernarvonshire.

257. CARBONATE of IRON, occurring in a layer parallel to the wall of a Copper Lode.
Wheal Tolgus, Redruth, Cornwall.
Presented by John Michell.

258. Rhombohedral crystals of CARBONATE of LIME, and lenticular crystals of Carbonate of Iron sprinkled with Iron Pyrites, on crystallized Quartz, deposited upon cubic crystals, which have been removed by natural process, leaving their impressions.
Tamar Mines, Devon.

EXAMPLES OF THE ATTACHMENT OF NEWER DEPOSITED MINERALS TO CERTAIN SIDES ONLY OF PRIOR FORMED CRYSTALS.

Shelf II.

259. Magnificent crystals of GALENA, or Sulphide of Lead, partially encrusted with Quartz crystals.
Basore Mine, Parish of Kenwyn, Cornwall.

260. FLUOR SPAR, Calcareous Spar, Quartz, Pearl Spar, and Galena.
Durham.

261. Cubes of FLUOR, coated on certain sides only with Siderite, or Carbonate of Iron.
Henry's Vein, Allenheads, Northumberland.

262. Crystallized GALENA and CALCAREOUS SPAR.
Lisburne Mines, Aberystwith, Cardiganshire.
Presented by the late Captain Eddy.

263. Specimen from a "vug" or hollow in a COPPER LODE. Crystallized Copper Pyrites occurs on one side of a set of Quartz crystals, and Iron Pyrites on the other, showing that some force so governed their relative positions that they were formed in distinct directions.
Consols Mine, Gwennap, Cornwall.
Presented by R. W. Fox, F.R.S.

264. Cube of FLUOR SPAR, with Quartz on one face, and Calc Spar on the others.
Aldstone, Cumberland.

265. Cubes of FLUOR, encrusted on certain sides only with Quartz and Zinc Blende.
Aldstone, Cumberland.

266. GALENA and crystallized CALC SPAR.
Ticknall, Leicestershire.

The sulphide of lead on one side of this plate is quite bare, on the other covered with crystals of Calcite.

267. QUARTZ, sprinkled on one side only with Crystals of Galena and Pearl Spar.
Tamar Silver Lead Mines, Devonshire.

Shelf III.

268. IRON PYRITES and Carbonate of Iron.
Virtuous Lady Mine, Devon.

269. FAHLERZ, GALENA, and QUARTZ pseudomorphous after Barytes; the crystals of Fahlerz (tetrahedrite) gilded as it were with Copper Pyrites, may be observed to be almost confined to one side of the large tabular crystals.
Liskeard, Cornwall.

270. Fluor Spar, encrusted with Quartz, differently on various sides.
Durham.

271. Crystals of Fluor, with Calc Spar.
Durham.

272. Quartz, Calc Spar, and Fluor Spar, on Carbonate of Iron.
Durham.

273. Fluor Spar, showing that the increments of the crystals have been influenced by forces acting unequally in different directions.
Beer Alston, Devon.

Shelf IV.

274. Fluor Spar and Nodular Galena, on a disintegrated Limestone.
Durham.

275. Galena, with corroded surface, and partially covered with Quartz.
Nant-y-Creiau Mine, Cardiganshire.

276. Galena, invested with and containing Calc Spar, Iron Pyrites, and fragments of Sandstone.
Ticknall, Leicestershire.

277. Galena, with Fluor Spar, on Sparry Iron Ore.
Aldstone, Cumberland.

278. Galena, with its surfaces singularly rounded before investment by Iron Pyrites, and Calc Spar.
Ticknall, Leicestershire.

279. Fluor Spar, broken, and the fragments cemented by subsequently crystallized Barytes.
Huel Mary Ann, Cornwall.

280. Cube of pale Fluor Spar, with Quartz crystals attached to the faces, and with Iron Pyrites only on certain sides.
Aldstone, Cumberland.

Evidence of Successive Openings in Lodes.

Shelf V.

281. Part of a Copper Lode, exhibiting several plates or "combs."
Wheal Julia, Crowan, Cornwall.
Presented by Sir H. T. De la Beche.

282. Part of a Copper Lode, showing a plate of Quartz against a plate of Copper Pyrites.
Godolphin Bridge Mine, Cornwall.
Presented by Sir H. T. De la Beche.

283. Vein of Calc Spar, showing by its "comby" portions that the fissure has been twice open.
Carboniferous Limestone of Caldon Low, North Staffordshire.

284. Portion of a Copper Lode, consisting of alternate veins of Copper Pyrites and Quartz.
Presented by John S. Enys, F.R.S.

285. Metalliferous Gangue: Silver, with a small portion of Gold, the whole intersected by newer veins of spar.
Hanging branch of the Biber Lode, Christina Mine, Schemnitz, Hungary.

286. Argentiferous Galena, singularly corroded, and partially encrusted with Quartz.
Goginan Mine, Cardiganshire.

287. Cubes of Fluor, thickly encrusted on certain sides only with crystallized Carbonate of Iron.
Aldstone, Cumberland.

Shelf VI.

288 and 289. Conglomerate, filling a "slide" which heaves the Lode, and containing fragments of rich Copper Pyrites broken off from the Copper Lode.
From the 30 fathoms level, Knockmahon Mine, Co. Waterford, Ireland.

290. Part of a Copper Lode, exhibiting many plates or combs.
Wheal Cathedral, Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

291. Galena, with veins of Quartz.
Nant-y-Mwyn Mines, Cilcwm, Caermarthenshire.
Presented by Captain Harris.

292. Portion of adjoining "Country" imbedded in crystallized Quartz.
Knockmahon Mines, County Waterford, Ireland.

293. Part of a Copper Lode. Combs or plates in which Copper Pyrites and Blende are disseminated.
West Wheal Alfred, Hayle, Cornwall.
Presented by Sir H. T. De la Beche.

Shelf VII.

294. Part of a Copper Lode, where not very productive.
Fowey Consols Mine, St. Blazey, Cornwall.
Presented by the late J. Austen Treffry.

295. Part of a Copper Lode of fair produce.
Fowey Consols Mine, St. Blazey, Cornwall.
Presented by the late J. Austen Treffry.

296. Part of a large Copper Lode, with a strong rib of Mispickel, or Arsenical Pyrites.
Holmbush Mine, Callington, Cornwall.

Examples of Breccia Lodes with Non-metallic Cement.

Wall-case 31.

Shelf I.

297. Brecciated portion of a Copper Lode. A little Oxide of Copper occurred here; the fragments are of Serpentine, the paste of steatite and calcite.
Huel Downas, St. Keverne, Cornwall.
Presented by Sir H. T. De la Beche.

298. Vein-stuff, showing a brecciated portion of north and south Lodes.
Gyrn vein, Holywell, Flintshire.

299. Brecciated Lode, with Galena and Carnelian.
Bwlch-y-Plwm, near Tan-y-Bwlch, Merionethshire.

300. Brecciated Lead Lode, with veins of Carnelian.
Bwlch-y-Plwm, Merionethshire.
Presented by W. W. Smyth, F.R.S.

301. Brecciated portion of a Copper Lode.
Huel Trenwith, St. Ives, Cornwall.
Presented by Sir H. T. De la Beche.

Shelf II.

302. Rock, intersected by veins of Quartz with a little Copper Ore.
Pary's Mine, Open Cast, Anglesey.

303. Breccia, cemented by Brewsterite (*a Hydrous Silicate of Alumina, Baryta, and Strontia*).
Strontian, Argyleshire.

304. Brecciated Lead Lode. Fragments of Black Clay Slate, cemented by Brown Spar.

305. Brecciated Copper Lode. Fragments of rock cemented by Quartz, coated with Green Carbonate of Copper.
Burra Burra Mines, South Australia.

306. Fragments of Greenstone, surrounded by Zinc Blende, Galena, and Pyrites, and cemented by Quartz into a breccia.
Theresa Lode, Schemnitz, Hungary.

307. Brecciated portion of a Copper Lode. Fragments of

Slate, Quartz, and Blende, cemented by Carbonate of Iron.
Binner Downs Mine, Crowan, Cornwall.
Presented by Sir H. T. De la Beche.

308. Galena and Blende Lode. "Plate rider" showing the investment of fragments of Rock first with chalcedonic, then with transparent Quartz.
Smittergill Head, Cumberland.
Presented by W. W. Smyth, F.R.S.

309. Vein Stone, showing the successive crystallizations around fragments of "Plate rider," consisting of transparent and opaline Quartz and Fluor Spar.
From hard portions of the vein, Stanhope Burn, Weardale, Durham.

310. Fragments of Greenstone, cemented by Quartz into a breccia.
Theresa Lode, Schemnitz, Hungary.

Shelf III.

311. Brecciated Silver Lead Ore, producing on the average 32 ozs. Silver per ton of Lead.
Daren Lead Mine, near Aberystwith, Cardiganshire.
Presented by Captain John Paull.

312. Fragments of Magnetic Iron Ore, in Quartz, and intersected by veins of Epidote.
Philipstad, Sweden.

313. Part of a Copper Lode, exhibiting cavernous or "vuggy" part of a Lode.
Trewarvas Mine, Trewarvas Head, Cornwall.
Presented by Sir H. T. De la Beche.

314. Portion of a Brecciated Lode, the cementing matter chiefly purple Fluor Spar.
Crich, Derbyshire.

315. Fragments of Limestone, around which have crystallized Fluor Spar, Barytes, and Calcite.
Crich, Derbyshire.

316. Fragment of rock cemented by Sulphate of Baryta.
Part of the Lode of Lead of Ballinafunshogue, Glenmalure, County Wicklow, Ireland.

Shelf IV.

317 and 318. Fragments of Sandstone, cemented by pink Sulphate of Baryta.
Cumberland.

319. Illustration of Mineral Veins. Gypsum deposited in a boiler:—columnar-crystalline next the wall, brecciated towards the interior of boiler, and colourless crystals in the cavernous parts.
Tamar Mines, Devon, 1855.

320. Copper Pyrites, and fragments of black Slate cemented by Quartz.
Knockmahon Mine, Co. Waterford, Ireland.
Contributed by the Geological Survey.

321. Galena and Sulphate of Baryta.
Ireland.
Presented by John Taylor, jun., F.G.S.

322. Fragments of the adjoining rock in a Tin Lode.
Perran Downs, Perranuthnoe, Cornwall.

323. Galena, with fragments of slate encased in quartz and chlorite.
Cornwall.

Shelf V.

324. Lode containing irregular fragments of Galena, Blende, and Copper Pyrites, in a mass of Calc-spar.
Henfwlch, Cardiganshire.

325 and 326. Galena and Sulphate of Baryta.
Ireland.
Presented by John Taylor, jun., F.G.S.

327. Zinc Blende, accompanied by Fluor.
Smittergill Head, Cumberland.

328. Breccia specimen of the Lode called the Wolfgang,
From the Biber Adit, Christina Mine, Schemnitz, Hungary.

329. "Stamp" Ore for Gold. Breccia Lode, with disseminated Galena and Pyrites.
Theresa Lode, Schemnitz.

330. Brecciated Lode, fragments of black Diorite, the cement chiefly Quartz.
Theresa Lode, Schemnitz.

331. Fragments of Slate, cemented by Quartz and Chlorite, and traversed by strings of Copper Pyrites.
Binner Downs Mines, Crowan, Cornwall.
Presented by Sir H. T. De la Beche.

331a. Fragments of Coal, cemented by Witherite, or Carbonate of Baryta.
Fallowfield Mine, near Hexham, Northumberland.
Presented by Messrs. Walton and Cowper, 1861.

Shelf VI.

332. Brecciated portion of a Copper Lode.
Consols Mines, Gwennap, Cornwall.
Presented by Sir H. T. De la Beche.

333. Brecciated Lode of Argentiferous Galena.
Cardiganshire.

334. Brecciated and Conglomerated Lode. Fragments of Slate and pebbles of Granite, cemented by the siliceous matter of the Lode.
Huel Badger, Gwinnear, Cornwall.
Presented by Sir H. T. De la Beche.

335. Argentiferous Galena.
Llanfair Clydoge Mine, Lampeter Cardiganshire.

336. Fragments of Slate, cemented by Quartz intermingled with Copper Pyrites.
Wheal Trenwith, St. Ives, Cornwall.
Presented by Sir H. T. De la Beche.

337. Brecciated Copper Lode, containing fragments and pebbles of Slate.
Huel Herland, Cornwall.
Presented by Sir H. T. De la Beche.

Examples of Breccia Lodes with Cement of Metallic Mineral.

Shelf VII.

338. Brecciated Copper Lode: Bornite, or Purple Copper Ore, cementing fragments of rock.
Hammerfest, Norway.
Presented by the late Michael Williams, M.P.

339. Galena, massive part of the lode, with occasional brecciform portions.
Cwm-y-swm, 8 miles from Dolgelly, North Wales.

340. Breccia Lode, in which fragments of Killas, or Clay Slate, are cemented by Copper Pyrites and Carbonate of Iron.
Tavistock, Devon.

341. Brecciated Lode consisting of fragments of black and green slaty rock, cemented by Quartz, and highly crystalline Blende.
North Huel Tamar, Launceston, Cornwall.

Wall-case 32.

Shelf I.

342. Portion of a Brecciated Copper Lode. Black Killas cemented by Copper and Arsenical Pyrites.
Wheal Friendship, Tavistock, Devonshire.
Presented by Richard Taylor, F.G.S.

343. Mispickel, or Arsenical Pyrites, cementing fragments of the surrounding rocks; rich mass curiously intermingled with Pyrites, &c.
Back of the lead lode, Penrhiw Lead Mine, near Aberystwith, Cardiganshire.
Presented by Sir H. T. De la Beche.

344. Silver Lead Ore, with fragments of grey killas imbedded.
Daren Lead Mine, near Aberystwith, Cardiganshire.
Presented by Captain John Paull.

345. Portion of the Lode, showing fragments of the adjoining rock cemented by Blende, or Sulphide of Zinc.
Nant-y-Creiau Lead Mine, near Aberystwith, Cardiganshire.
Presented by R. Bincks.

Shelf II.

346. Galena, in circular deposits in Sandstone.
Grassington Lead Mines, near Skipton, Yorkshire.
Presented by the late Captain S. Eddy.

347. Brecciated Lode of Galena, cementing fragments of soft Killas.
Cronebane Mine, County Wicklow, Ireland.
Presented by W. W. Smyth, F.R.S.

348. Brecciated part of a Lode containing Galena and Blende.
Henfwlch, Cardiganshire, Wales.
Contributed by the Geological Survey.

349. Argentiferous Galena.
Llanfair Clydoge Mine, Lampeter, Cardiganshire.
Presented by Dr. Quin.

350. Brecciated Copper Lode. Fragments cemented by Copper, Arsenical, and Iron Pyrites.
Huel Friendship, Tavistock, Devonshire.
Presented by Sir H. T. De la Beche.

351. Brecciated Copper Lode. Fragments of rock cemented by Blue Carbonate of Copper.
Burra Burra Mines, South Australia.

352. Crystallized Galena, enveloping fragments of Sandstone.
Grassington Lead Mines, near Skipton, Yorkshire.
Presented by Captain S. Eddy.

353. Brecciated Copper Lode.
East Cornwall.

354. Brecciated Lode of Galena.
Cronebane Mine, Co. Wicklow, Ireland.
Presented by W. W. Smyth, F.R.S.

Shelf III.

355. Fragments of Grit, cemented by Galena and Blende.
Grassington Lead Mines, near Skipton, Yorkshire.

356. Galena, enveloping fragments of Coal.
Steel House Gill, Kirby Malyeard, Yorkshire.
Presented by Captain Tucker, R.E.

357. Breccia of Slaty Rock, cemented by Iron Pyrites.
Mona Mine, Anglesey.
Presented by W. W. Smyth, F.R.S.

358. Brecciated Copper Lode. Copper Pyrites and Mispickel cementing fragments of Killas.
St. Austell, Cornwall.

359. Iron Pyrites, broken up after deposition, and cemented together by Galena.
Churprinz Mine, Freiberg.

360. Part of a Lead Lode. Galena cementing fragments of white Killas.
Red Moor Mine, Callington, Cornwall.
Presented by Sir H. T. De la Beche.

361. Sandstone, fragments in Galena.
Grassington Lead Mines, Yorkshire.
Presented by the late Captain Eddy.

Shelf IV.

362. Brecciated Lead Lode.
Cardiganshire.

363. Copper Pyrites, with fragments of Clay Slate.
Mona Mine, Anglesey.
Contributed by the Geological Survey.

364. Copper Pyrites, with fragments of Clay Slate from the walls.
Tre r'ddol, Cardigan.

365. Brecciated Copper Lode.
East Cornwall.

366. Part of a Brecciated Lode. Angular fragments of

black Killas cemented by Copper Pyrites.

Huel Friendship, Tavistock, Devonshire.

Presented by Sir H. T. De la Beche.

367. Brecciated Lode of Copper Pyrites.

Carmel's Point, Anglesey.

Shelf V.

368. Brecciated Lode of Red Hæmatite, cemented by Calc Spar.

Ulverstone, Lancashire?

369. Conglomerated Lode. Pebbles cemented by Copper and Iron Pyrites.

Relistian Mine, Cornwall.

Presented by G. C. Fox.

370. Brecciated Copper Lode. Fragments of Slate and Zinc Blende cemented by Carbonate of Iron.

Dyffryn Castell, Cardiganshire.

371. Brecciated Lead Lode, the cementing material being Zinc Blende and Carbonate of Lime and Iron.

Llyn-y-parch, Bettws-y-coed, Caernarvonshire.

372. Argentiferous Galena, producing 36 oz. Silver per ton of Lead.

Cwm Symlog Lead Mine (that chiefly worked by Sir Hugh Middleton), near Aberystwith, Cardiganshire.

Presented by Captain Reed.

373. Brecciated Tin Lode, in which pebbles of slate are cemented by crystallized Peroxide of Tin.

Relistian Mine, Cornwall.

Presented by the late Joseph Carne, F.R.S.

374. Brecciated Copper Lode, in which fragments of Ore or Slate are nuclei for the crystallization of Quartz from a mass, chiefly of Carbonate of Iron.

Esgair Hir Mine, Cardiganshire.

375. Brecciated Lode. Fragments of Quartz Rock cemented by Carbonate of Iron.

Ogo Gyfwr, near Cemmaes, Anglesey.

376. Fragment of a Brecciated Lode, containing Coal, Sulphide of Lead and Sulphide of Zinc.

Holywell Level Mine, near Holywell, Flintshire.

Presented by Mr. Williamson, Pendré, Holywell.

377. Veinstone, showing pieces of Slate broken after their first deposition in the Blende.

Esgair Hir Mine, Cardiganshire

Presented by W. W. Smyth, F.R.S.

378. Veinstone, showing portions of the Vein broken into angular fragments, and cemented together by the Sparry Iron Ore which encrusts them.

Lead Mines of Allenheads, Northumberland.

Shelf VI.

379. Part of a Lode in which pebbles are cemented by Peroxide of Tin, Chlorite, &c.

Relistian Mine, Cornwall.

Presented by the late Joseph Carne, F.R.S.

380. Veins of Galena, and a vein of Quartz in Slate, with fragments of slate included.

Silver Lead Lode, Daren Lead Mine, near Aberystwith, Cardiganshire.

Presented by Captain John Paull.

381. Galena with Blende.

Caegwernog and Berthllwyd Silver Lead Lodes, near Dolgelly, Merionethshire, N. Wales.

Presented by James Harvey.

382. Galena cementing fragments of adjoining Rock.

Lisburne Mines Aberystwith, Cardiganshire.

Presented by the late Captain Eddy.

Shelf VII.

383. Part of a Copper Lode. Mammillated Copper Pyrites of part of the lode has been broken

by some dislocating force, and the fragments so formed have been subsequently cemented by Iron Pyrites.

Virtuous Lady Mine, Tavistock, Devonshire.

Presented by Captain John Williams.

384. Hæmatite Iron Ore.

From the Great Lode 40 feet wide in the Mountain Limestone, Ulverstone, Lancashire.

The balls of Hæmatite are shattered and reunited on the north face of the lode to the distance of about 4 feet from the Limestone.

Presented by the late Dr. Buckland.

Wall-case 33.

Shelf I.

385. Part of a Lode, in which pebbles of Slate, and a few of Quartz, are cemented by Tinstone, Chlorite, &c.

Relistian Mine, Cornwall.

Presented by the late Joseph Carne, F.R.S.

(This large specimen is placed on the top shelf.)

386 to 388. Conglomerate Lode. Pebbles cemented by Copper Pyrites and Peroxide of Tin.

Relistian Mine, Cornwall.

Presented by the late J. Carne, F.R.S.

389. Brecciated Copper Lode, the cavities between the fragments not entirely filled up.

St. Austell, Cornwall.

390. Brecciated portion of a Copper Lode, containing fragments of the slate, traversed by the lode.

Wheal Providence, Gwinnear, Cornwall.

391. Brecciated and Conglomerated Lode. Fragments and pebbles of Slate, Elvan, and Quartz, cemented by the matter of the lode.

Huel Badger, Gwinnear, Cornwall.

Presented by Sir H. T. De la Beche.

Examples of Breccias with Fragments of pre-existing Lodes.

Shelf II.

392. Part of a Copper Lode, exhibiting a cavernous or "vuggy" portion.

Great St. George Mine, Perranzabuloe, Cornwall.

Presented by Henry Humphries.

393 to 395. "Flucan" filling a "slide," and including fragments, sometimes quartzose, sometimes orey, of the Copper Lode which it has heaved.

30 fathoms level, Knockmahon Mines, Co. Waterford, Ireland.

396. Blende and Quartz, intersecting Fluor Spar, and Quartz capped by Cacholong.

Smittergill Head, Cumberland.

Presented by W. W. Smyth, F.R.S.

397. Cacholong, investing Quartz, on Fluor Spar, illustrating the sequence of different varieties of Silica.

Smittergill Head, Cumberland.

398. Galena, enveloping fragments of rock.

Cardiganshire.

399. Fragments of "Wood Iron," (fibrous brown Peroxide of Iron) cemented by Oxide of Manganese.

Restormel Royal Iron Mine, near Lostwithiel, Cornwall.

400. Argentiferous Galena, containing fragments of rock.

Tamar Silver-lead Mines, Devonshire.

Presented by Messrs. Johnson and Cock.

401. Quartz, occurring in isolated balls in the cross-courses.

Knockmahon Mines, Co. Waterford, Ireland.

402. Wolfram, with transverse cracks filled with Copper Pyrites.

Carn-brea Mines, near Redruth, Cornwall.

Shelf III.

403 and 404. Strings of Peroxide of Tin, traversing Slate.
Huel Park, Polberro, St. Agnes, Cornwall.
Presented by John Taylor, jun., F.G.S.

405. Gangue, with fragments of lode.
From the Widersinnische Kluft (at a shallow level) in Christina Mine, Schemnitz, Hungary.

406. Gangue, traversed by new strings of Galena and Zinc Blende rich in silver.
1*st Widersinnische Kluft (contrary lode), from the Christina Mine, Schemnitz.*

407. Crystals of Fahlerz (Tetrahedrite), broken by nature in the lode, and the parts recemented by Copper Pyrites.
Herodsfoot Mine, near Liskeard, Cornwall.

408. Veinstone of "plate rider," in which veins of Quartz and Carbonate of Iron have been subsequently cut through and dislocated by veins of Quartz.
Stanhope Burn, Weardale, Durham.
Presented by W. W. Smyth, F.R.S.

409. Vein of Galena, Fluor spar, and Carbonate of Iron, traversed by newer vein of Quartz.
Stanhope Burn, Weardale, Durham.
Presented by W. W. Smyth, F.R.S.

410. Göthite (crystallized and fibrous brown Iron Ore), which after consolidation has been cracked, and again joined in the lode by crystalline Quartz.
Restormel Royal Iron Mine, near Lostwithiel, Cornwall.

411. Iron Pyrites, in transverse strings, traversing various substances in the Lode.
Binner Downs Mine, Cornwall.

Examples of Stalactitic Lode Deposits.

Shelf IV.

412. Asphalt, with Calc Spar.
Penalley Lead Mine, near Bishopscastle, Shropshire.

413 to 416. Asphalt, with Limestone.
Castleton, Derbyshire.

417. Asphalt, filling cavities in Carboniferous Limestone.
Staunton Harold, Ashby-de-la-Zouch.

418. Asphalt, on Carbonate of Lime.
Philipstad, Sweden.

419. Stalactitic Manganese Ore. Portions which have been broken off during the formation have been attached to the sides of the cavern by the viscosity of the outer coating of the stalactites.
Restormel Royal Iron Mine, Lostwithiel, Cornwall.

420. Stalactite, composed of Hydrous Oxide of Iron and Manganese.
Restormel, Cornwall.

421. Quartz, crystallized around Stalactites of Göthite, or Brown Iron Ore, which again is crystallized around a nucleus of Soft Red Iron Ore.
Restormel, Cornwall.

Shelf V.

422 and 423. Red Iron Ore, showing its formation in successive botryoidal layers.
Parkside Iron Mines, Cumberland.
Presented by the Parkside Mining Company.

424. Copper Pyrites, with Asphalt.
St. Agnes, Cornwall.
Presented by John Taylor, jun., F.G.S.

425. Stalactitic Iron Pyrites, hanging from the roof and walls of a "vug," or cavern.
Ways Lode, 70 fathoms deep, Great St. George Mine, Perranzabuloe, Cornwall.

426. Psilomelane (hard Oxide of Manganese) investing Lithomarge.
Restormel Royal Iron Mine, Lostwithiel, Cornwall.

427. Asphalt, with Calc Spar.
Castleton, Derbyshire.

428. Stalactitic Calamine, or Carbonate of Zinc.
Aldstone Moor, Cumberland.
Presented by the late John Taylor.

429. Stalactitic Brown Oxide of Iron.
Mines of Goruneschewsk, District of Alapayevsk, Russia.
Presented by the Imperial Mining Institute of Russia.

430. Mammillated Calamine.
Farnberry Mine, Aldstone Moor, Cumberland.
Presented by Melville Atwood.

431. Stalactitic Calamine.
Aldstone Moor, Cumberland.
Presented by the late John Taylor.

432. Calamine, illustrating the stalactitical formation of veins.
Farnberry Mine, Aldstone Moor, Cumberland.

Shelf VI.

433. Brown Spar of Stalactitic character, with Copper Pyrites from upper beds of Carboniferous Limestone.
Lime Pits Vein, Ecton, Staffordshire.

434. Carbonate of Iron, pseudomorphous and stalactitic.
Virtuous Lady Mine? near Tavistock.

435. Stalactitic Hæmatite.
Restormel Mine, Lostwithiel, Cornwall.
Presented by Sir H. T. De la Beche.

436. Stalactitic Quartz and Brown Iron Ore.

437. Brown Iron Ore, stalactitic, investing cubical crystals, which have disappeared.
St. Just, Cornwall.

438. Iron Pyrites, in stalactitic forms.
Virtuous Lady Mine, Devonshire.

Shelf VII.

439. Mammillated Calamine.
Farnberry Mine, Aldstone Moor, Cumberland
Presented by Melville Atwood.

440. Carbonate of Zinc, investing a Veinstone by deposition from the water dropping from the roof.
Farnberry Mine, Aldstone Moor, Cumberland.
Presented by Melville Atwood.

441. Psilomelane, or Hard Oxide of Manganese, in stalactites formed in vughs.
Restormel Royal Iron Mine, Lostwithiel, Cornwall.

442. Mammillated Calamine, or Carbonate of Zinc.
Farnberry Mine, Aldstone Moor, Cumberland.

443 and 444. Stalactitic Brown Iron Ore.
Easter Mine, Forest of Dean.
Presented by Robert Mushet and S. H. Blackwell.

Specimens in Evidence of Sliding Motion in Lodes, "Slickensides."

Wall-case 34.

Shelf I.

445. Part of a Lead Lode, showing a smoothed and scored surface.
North Huel Tamar, Launceston, Cornwall.
Presented by Sir H. T. De la Beche.

446. Specular Galena, or Slickenside (*Spiegel, Rutzschfläche*, or *Harnisch*, of the German miners).
Grassington Lead Mines, near Skipton, Yorkshire.

447. Slickenside Lead Ore.
Grassington Lead Mines.
Nos. 446 and 447 presented by the late Captain S. Eddy.

448. Galena, of a peculiarly compact texture, accompanying the slickenside in the Ruplagh Lode.
Glendasane, Wicklow, Ireland.

Shelf II.

449. Specular Galena, or Slickenside.
Grassington Lead Mines, near Skipton, Yorkshire.
Presented by the late Captain S. Eddy.

450. Slickenside, in Ore of Cobalt and Nickel, the scores and striæ well shown.
Dobschau, Hungary.

451. Slickenside Lead Ore.
Tamar Silver Lead Mines, Devonshire.
Presented by P. N. Johnson, F.R.S.

452. Slickenside, in Iron Pyrites.
Ballymurtagh Mine (N. Lode), Wicklow, Ireland.

453. Slickenside, from a Copper Lode.
Wheal Friendship, Tavistock, Devonshire.
Presented by Richard Taylor, F.R.S.

Shelf III.

454 & 454a. Slickensides.
Carn Brea Mines, Redruth, Cornwall.
Presented by the late J. Garby.

455. Slickenside, in black shale.
Ogo Gyfwr, Llanbadrig, near Cemmaes, Anglesey.

456. "Slip-faces," in the Coal Measures, where much broken and disturbed, above the coal seam of
Lower Firoda, Co. Kilkenny, Ireland.

457. Black Carbonaceous Shale, with friction-polished surfaces or "slip-faces," accompanying faults.
Roof of Englefield Colliery, Holywell, Flintshire.

458. Slickenside, in different directions, and exhibiting Copper and Iron Pyrites.
In slate above the roof of coal, Lower Firoda, Co. Kilkenny.

459. Slickenside, in Sparry Iron Ore.
From the Lead "flat veins," Allenheads, Northumberland.

Illustrations of Cellular Lodes. Incrustation and subsequent disappearance of prior formed Minerals.

Shelf IV.

460. Iron Pyrites, deposited on Fluor Spar, fragments of which remain with pseudomorphous Pearl Spar.
Devonshire.

461. Octohedron of Fluor Spar, partly covered with Quartz.
Consolidated Mines, Gwennap, Cornwall.

462 & 463. Pseudomorphous crystals of Quartz, the octohedral Fluor which gave them their form having disappeared.
Consolidated Mines, Cornwall.
Presented by R. W. Fox, F.R.S.

464. "Dog-tooth" crystals of Calc Spar have been invested with Carbonate of Iron, then removed, and the internal and external surfaces sprinkled with Calc Spar.
Long Cleugh Vein, Aldstone Moor, Cumberland.

465. Iron Pyrites, with impressions of crystals of Barytes, which have disappeared.
Huel Mary Ann, Cornwall.

466. Zinc Blende, with cubic impressions of Fluor Spar crystals.
Aldstone Moor, Cumberland.

467. Pseudomorphous crystals of Calamine.
Presented by the late G. B. Greenough, F.R.S.

468. Tabular crystals of Bournonite coated with Copper Pyrites, forming an investment pseudomorph.
Herodsfoot Mine, near Liskeard, Cornwall.

Shelf V.

469. Quartz, crystallized on tabular Calc Spar, which has been removed.
Huel Alfred, Hayle, Cornwall.

470. Iron Pyrites, which has been deposited on Gypsum? and on Fluor Spar.
Virtuous Lady Mine, Tavistock, Devonshire.

471. Unusually large example of Pseudomorphous Carbonate of Iron.
Virtuous Lady Mine, Tavistock.

472 and 472a. Pseudomorphous crystals of Carbonate of Iron.
Virtuous Lady Mine, Tavistock.
Such forms as the specimens Nos. 471 and 472 are locally termed "Slippers," and have been formed by the incrustation of crystals, probably of gypsum, by carbonate of iron.

473. Copper Pyrites and Quartz, crystallized in cavities of pre-existing cubic crystals.
Virtuous Lady Mine, Tavistock.

474 to 476. Tetrahedral crystals of iridescent Copper Pyrites, with Quartz, in cubic cavities of Carbonate of Iron, left by the disappearance of Fluor.
Virtuous Lady Mine, Tavistock.

477. Quartz, as an investment pseudomorph of Pearl Spar, or Carbonate of Lime, Magnesia, and Iron.
Restormel Royal Iron Mine, near Lostwithiel, Cornwall.
The pseudomorphs are here evidence of the former existence of carbonates in the lode, although no particle of them is now to be found.

478. Iron Pyrites, in rhombohedral crystals, as an investment pseudomorph of Calc Spar.
Liskeard, E. Cornwall.

479. Calc Spar, with pseudomorphous impressions of crystals of Barytes, in which Iron Pyrites has crystallized.
Herodsfoot Mine, near Liskeard.

480. Pseudomorphous impressions of crystals of Barytes, in crystalline Quartz.
Huel Mary Ann, Cornwall.

481. Sequence of deposition of Quartz, Fluor Spar, and Quartz; then removal of Fluor Spar, and finally deposition of Zinc Blende.
Long Cleugh Vein, Aldstone Moor, Cumberland.

Shelf VI.

482 & 483. Pseudomorphous crystals of Quartz, the two specimens fitting each other.
Consolidated Mines, Gwennap, Cornwall.

484. Octohedral Fluor Spar, incrusted with Quartz.
Consolidated Mines, Gwennap.

485. Quartz, with Iron Pyrites; incrustation of an octohedral crystal of Fluor Spar.
West Caradon Mines, Cornwall.

486. Quartz, in the form of octohedrons of Fluor.
From the great cross course in Holmbush Mine, near Callington, Cornwall.
Presented by W. W. Smyth, F.R.S.

487. Quartz, which invested crystals of Fluor Spar that have since disappeared.
Long Cleugh Vein, Aldstone Moor, Cumberland.

Shelf VII.

488. Cavernous Quartz, with pseudomorphous impressions.
Bog Mine, Shropshire.

489. Quartz and Zinc Blende, with impressions of Fluor Spar.
Aldstone Moor, Cumberland.

490. Incrustation of Fluor Spar by Quartz, with subsequent disappearance of the Fluor, and addition of Zinc Blende.
Aldstone Moor.

491. Quartz, pseudomorphous after octohedral Fluor Spar.
Trehane Mine, near Liskeard, Cornwall.

492. Quartz, with pseudomorphous cubic impressions.
Dolcoath Mine, near Camborne, Cornwall.
Presented by the late John Garby.

493. Brown Iron Ore, in rhombohedral crystals, pseudomorphous after Carbonate of Iron.
Restormel Royal Iron Mine, near Lostwithiel, Cornwall.

494. Brown Iron Ore, and Quartz, proving by the form in which they have been deposited, the former presence of rhombohedral carbonates.
Taylor's level, Restormel Mine, near Lostwithiel.

Wall-case 35.

Shelf I.

495. Cavernous Quartz. An example of what often appears on a considerable scale where pseudomorphous action has been rife.

496. Quartz, with pseudomorphous impressions.
Little North Lode, Dolcoath Mine, near Camborne, Cornwall.

497. Auriferous Quartz, with pseudomorphous impressions.

498. Cellular Auriferous Quartz.
Cwm Eisen or Cwm Heisian Lead Mine, Merionethshire.
Presented by James Harvey.

499 and 500. Cellular Quartz, with pseudomorphous impressions.
From the back of the Lead Lode, Pen-y-clyn, near Llanidloes, Montgomeryshire.
Presented by W. W. Smyth, F.R.S.

Illustrations of Anogenic Alterations in Lodes, or changes originating in the Upper Part. Sulphides converted into Oxides and Metallic Salts.

Shelf II.

501. Cavernous part of a Lode, containing crystallized Sulphide of Copper and Black Oxide of Copper.
Great Work, Breague, Cornwall.
Presented by John Sylvester.

502. Cavernous portion of a Copper and Lead Lode, illustrating the formation in the vein of carbonates by the decomposition of Copper Pyrites, &c.
"The Lime pits," Ecton, Staffordshire.

503. Galena, with Brown Oxide of Iron, the cleavage fissures of the galena filled with white and green lead ore.
Mines of Beresow, Uralian Mountains, Russia.
Presented by the Imperial Mining Institute of Russia.

504. Argentiferous Galena, mingled with White Lead Ore, or Carbonate of Lead.
Eaglebrook Mine, Cardiganshire.
Presented by W. Spooner.

505. Galena, with Phosphate of Lead.
Brassington, Derbyshire.

506. Galena and Phosphate of Lead.
Golden Valley, Bonsal, Derbyshire.

507. Galena, with Anglesite, or Sulphate of Lead.
Golden Valley, Bonsal.

508. Galena, with Cerussite, or Carbonate of Lead.
Golden Valley, Bonsal.
Nos. 505 to 508 presented by Sir H. T. De la Beche.

509. Cerussite, or Carbonate of Lead, crystallized on Quartz.
Cumberland.

510. Galena, with Carbonate of Lead, or Cerussite, clearly derived from the decomposition of the galena.
Brassington, Derbyshire.

511 and 512. Crystallized Cerussite.
From shallow workings at Brassington, Derbyshire.

513. AURICHALCITE, a hydrous carbonate of zinc and copper, occurring in shallow "pipe veins."
Matlock, Derbyshire.

Shelf III.

514 and 514 a. CERUSSITE, in unusually large crystals.

515 to 516. GALENA and CERUSSITE, showing the process of change from galena to cerussite and further to pyromorphite.
Brassington, Derbyshire.

517. GALENA, encrusted with iron-stained Carbonate of Lead ("Gossan" lead ore).
From the 18 fathoms level, Smittergill Head Mine, Cumberland.

518. Lead "GOSSAN," with crystals of Carbonate of Lead.
From a depth of 8 or 10 fathoms in the adit level, Eaglebrook Mine, Cardiganshire.
Presented by W. Spooner.

519. Small vein filled with interlacing prismatic crystals of CARBONATE OF LEAD.
Leadhills, Lanarkshire.

520. CARBONATE OF LEAD, with stalactitic Brown Iron Ore, the crystals of Carbonate being partially encrusted with the Oxide of Iron.

521. CRYSTALLIZED ANGLESITE, or Sulphate of Lead.
Leadhills, Lanarkshire.

522. ARSENIO-PHOSPHATE OF LEAD.
Cumberland.

523. ARSENIO-PHOSPHATE OF LEAD, with Peroxide of Manganese, and Barytes.
Drygill, Cumberland.
Presented by H. L. Pattinson.

524. ARSENIATE OF LEAD.
Huel Alfred, Hayle, Cornwall.

525. CROCOISITE, or Chromate of Lead, with Phosphate of Lead, and Brown Iron Ore.
Mines of Beresow. District of Ekaterinbourg, Russia.
Presented by the Imperial Mining Institute of Russia.

Shelf IV.

526. ANGLESITE, on Brown Iron Ore.
Pary's Mine, Anglesey.

527. ANGLESITE, on Brown Iron Ore.
From the great open cast, Pary's Mine.
Presented by H. Bauerman, F.G.S.

528. ANGLESITE, well crystallized.
Wheatley Mine, Chester Co., Pennsylvania.

529, CERUSSITE, or Carbonate of Lead.
Wheatley Mine.

530 and 530 a. PYROMORPHITE, or Phosphate of Lead.
Wheatley Mine.

531. CHROMO-MOLYBDATE OF LEAD, with Pyromorphite.
Wheatley Mine.
Nos. 528 to 531 presented by Charles Sanderson.

532. CHALCOTRICHITE, or "Plush Copper Ore" (Capillary Red Oxide of Copper), with Green Carbonate of Copper, and Brown Oxide of Iron.
Fowey Consols, St. Blazey, Cornwall.

Shelf V.

533. CARBONATE OF LEAD, with Carbonate of Copper, in Gossan.
La Motte Mine, Missouri, North America.

534 and 534a. GOSSAN ORE, with Carbonates of Lead and Copper, and earthy Cobalt Ore.
La Motte Mine, Missouri.
Nos. 533 to 534a presented by W. W. Smyth, F.R.S.

535. ARSENIATE OF COBALT on Smaltine, or tin-white Cobalt.
Dolcoath Mine, near Camborne, Cornwall, 1855.
Presented by the late John Garby.

536. "BLUE LEAD ORE," a Pseudomorph of GALENA, after Pyromorphite, or Phosphate of Lead.
Wheal Hope, Perranzabuloe, Cornwall.

537. Blue Lead Ore.
Huelgoet, Brittany.

538. Brown Iron Ore, in pentagonal dodecahedrons, pseudomorphous after Iron Pyrites.
Hennock, near Chudleigh, Devonshire.
Presented by C. D. Archbold.

539. Iron Pyrites, decomposed on the surface into Brown Iron Ore.
Swindon, Wiltshire.
Presented by J. Matthewman.

540. Iron Pyrites, decomposed.
Boyton, Wiltshire.

541. Iron Pyrites, decomposed.
Warminster, Wiltshire.

542. Iron Pyrites, decomposed.
South Street, near Lewes, Sussex.

543. Iron Pyrites, decomposed.
Reigate, Surrey.
Nos. 540 to 543 presented by the late G. B. Greenough, F.R.S.

544. Red Iron Ore, pseudomorphous after scalenohedral crystals of Calc Spar.
Parkside Mines, Cumberland.
Presented by the Parkside Mining Company.

545. Red Iron Ore, pseudomorphous after large scalenohedral crystal of Calc Spar.
Siegen, Prussia.
Presented by the Zollverein Commissioners, 1862.

546. Calamine, or Carbonate of Zinc, pseudomorphous after Calcite.
Iserlohn, Prussia.
Presented by the Zollverein Commissioners, 1862.

546a. Manganite, pseudomorphous after Calcite.
Ihlefeld, Hartz.

547. Pseudomorphous crystals of Copper Pyrites, on crystallized Carbonate of Iron.
St. Just, Cornwall.
Presented by G. C. Fox.

548. Chalcedony, pseudomorphous after Calcareous Spar and Pearl Spar.
North Roskear, Cornwall.

549. Chalcedony, in pseudomorphous rhombohedrons, on Quartz.
Levant Mine, St. Just, Cornwall.

Shelf VI.

550. Carbonate of Lead.
Jamaica Mine, Mold, Flintshire.
Presented by W. B. Dyer.

551 and 551a. Phosphate of Lead.
Bonsal, Derbyshire.

552. Gossan, with Phosphate of Lead.
Winster, Derbyshire.

553. Chromate of Lead, with Brown Iron Ore.
Mines of Beresow, Uralian Mountains, Russia.
Presented by the Imperial Mining Institute of Russia.

554. Blue and green Carbonates of Copper, usually characteristic of shallow depths.

Shelf VII.

555. Gossan Ore, containing Galena, Carbonate of Lead, Quartz, and Hydrous Oxide of Iron.
From above the adit level, Eaglebrook Mine, Cardiganshire. August 1855.
Presented by W. Spooner.

556. Gossan, with crystallized Carbonate of Lead.
Logylas Mine, Yspytty Ystwyth Aberystwith, Cardiganshire.
Presented by the late John Taylor, F.R.S.

557. Bournonite (an Antimonio-sulphide of Lead and Copper), and Copper Pyrites, with crystallized Calc Spar and Quartz.
Liskeard, E. Cornwall.

Wall-case 36.

Shelf I.

558 & 559. "Gossan," a ferruginous substance occurring at the top of Lodes, from which miners judge of the probable occurrence of ore beneath.
Fowey Consols Mine, St. Blazey, Cornwall.
Presented by the late Sir H. T. De la Beche.

560 & 561. Copper Gossan.
Hingston Down Consols, Cornwall

562. Gossan Ore, of Copper Glance and Black Oxide of Copper.
From the 16 *fathoms level, South Bedford, near Tavistock, Devon.*
Presented by the Tavistock Committee for the International Exhibition, 1862.

Shelf II.

563. Argentiferous Gossan.
Fowey Consols, St. Blazey, Cornwall.
Presented by the late J. Austen Treffry.

564. Gossan, containing Carbonate and Red Oxide of Copper.
From the 45 *fathoms level, Huel Edward, Cornwall,* 1855.

565. Gossan, from *Huel Josiah, Devon Great Consols*, in which Gossan was followed to a depth of 40 fathoms before Copper Ore was cut.
Presented by Alexander Allen.

566. Copper Gossan.
Eaglebrook Mine, Cardiganshire.
Presented by W. Spooner, 1857.

567. Gossan, from the surface of a lead lode.
Cubert United Mines, Cornwall.

568 & 569. Lead Gossan.
From the 10 *fathoms level, Huel Peru, near Cubert, Cornwall,* 1855.

570. Gossan.
Wheal Trefusis, on the north-west part of Carn Marsh, near Redruth, Cornwall.

571. Gossan, containing Copper Glance, and Carbonates of Copper.
Wheal Trefusis, Cornwall.

572. Blue Carbonate of Copper, &c.
From shallow workings, Vigra Copper Mine, N. Wales.

573. Copper Gossan.
Occurring in the adit level, from 8 *to* 10 *fathoms deep, Eaglebrook Mine, Cardiganshire.*
Presented by W. Spooner.

574. Gossan of Lead Lode.
From 8 *to* 10 *fathoms deep in Eaglebrook Mine, Cardiganshire.*

Shelf III.

575. Zippeite, or Uran Ochre.
Withiel Mine, Withiel, Cornwall.

576. Gossan, or breccia of slate, quartz, and porphyry.
Carrigroe, N.N.E. Tinahely, Co. Wicklow, Ireland.

577. Argentiferous Gossan.
Tschitlü Mine, Kieban Maden, South Armenia.
Presented by W. W. Smyth, F.R.S.

578. Gossan Breccia, occurring between the mass of Pyrites and the Ophiolite Rocks at
Argana Maden, South Armenia.
Presented by W. W. Smyth, F.R.S.

579. Gossan, with disseminated crystals of Cuprite, or Red Oxide of Copper.
From the 150 *fathoms level, West Sharp Tor Mine, Liskeard, Cornwall, December* 1861.

579a. Gossan.
Wheal Druid, Carn Brea, near Redruth, Cornwall.
Presented by the late J. Garby.

580. Lead Gossan.
From 8 *to* 10 *fathoms deep in Eaglebrook Mine, Cardiganshire.*
Presented by W. Spooner.

581. Gossan Ore of Copper Pyrites, Oxide and Carbonate of Copper, with earthy Cobalt Ore and White Lead Ore.
From Berryman's "diggings," La Motte Mine, Missouri.
Presented by W. W. Smyth, F.R.S.

Shelf IV.

582. Gossan, containing Sulphide of Copper.
Devon Burra Burra, near Tavistock, 1853.

583. Gossan.
Wheal Buller, Cornwall.
Presented by the late J. Garby.

584. Gossan, with Garnets and Carbonate of Iron, partly decomposed.
Iron Mine, near Lostwithiel, Cornwall.

585. Stalactitic variety of Gossan.
North Wheal Jane, Truro, Cornwall, 1863.
Presented by W. W. Smyth, F.R.S.

586. Upper part of a Copper Lode.
Cornwall.

587. Upper part of a Copper and Tin Lode.
Marazion Mines, near Penzance, Cornwall.

588 and 589. Cupreous Iron Ochre, deposited in the pumps.
Pembroke Mine, Cornwall.

Nos. 586 to 589 presented by Sir H. T. De la Beche.

Examples of the Production of Native Metals by Alterations in Lodes.

Shelf V.

590. Crystallized Malleable Copper, deposited within 15 years on a clinker lying among the refuse heaps of
Wheal Leisure, Perranzabuloe, Cornwall.

591. Metallic Copper, formed on an iron ladder stave, from a mine which had been abandoned for many years.
Presented by P. N. Johnson, F.R.S.

592 and 593. Precipitated Copper, deposited in the old pit work, where it had been covered with water for eight months.*
Connoree Mines, Ireland.
Presented by Thomas Cornish.

594. Native Copper, occurring in the shallow levels of
Knockmahon Mine, Co. Waterford.

595. Native Copper, filling the fissures of a pyritous vein.
Co. Wicklow, Ireland.

596. Native Copper.
Copper Falls Mine, Keewenaw Point, Lake Superior.
Presented by C. Jackson.

597. Native Copper, in octohedral crystals, pseudomorphous after Cuprite, or Red Oxide of Copper.
Nijnei Taguil, Siberia.

598. Galena, with Capillary Native Silver.
Portion of the Lead Lode, Co. Dublin.
Contributed by the Irish Geological Survey.

599. Capillary Native Silver.
Devonshire.

600. Native Silver.
Wheal Brothers, Cornwall.
Presented by R. Davey, M.P.

601. Native Silver, on Sulphides of Silver and Lead.
San Acacias, Zacatecas, Mexico.

602. Native Silver, disposed on a fissure surface in the veinstone.
Catorce, S. America.

603. Native Silver, with Sulphide and Antimonial Sulphide of Silver, Galena, and Zinc Blende; in Carbonate of Lime.
San Francisco, Chañarcillo, Chile.
Presented by H.R.H. Prince Albert.

Shelf VI.

604. Native Copper.
Cliff Mine, Lake Superior.
Presented by C. Jackson.

605. Gossany Copper Ore.
Ham Mine, near Ashbourne, Derbyshire.
Presented by H. Crace.

606. Red Oxide of Copper, decomposed into Green Carbonate.
Shallow level of Davy's Shaft, Knockmahon Mine, Co. Waterford, Ireland.

607. Dark Gossan, with Black Oxide and Green Carbonate of Copper.
Cornwall.

Shelf VII.

608. Red Oxide of Copper, and Green Carbonate; very rich ore.
Cornwall.

609. Wolframine, or Wolfram Ochre.
From 140 *fathoms deep, East Pool Mine, near Redruth, Cornwall.*
Presented by the late John Garby, 1863.

* The important subject of the precipitations from "coppery water" is dwelt on at length it the description of the mines of Wicklow in the Memoirs of the Geological Survey, p. 385.

BRITISH COLONIES AND POSSESSIONS.

Wall-cases 37 to 42.

The events of the last few years have abundantly proved that the discovery of mineral wealth is the most powerful incentive to the exploration and settlement of distant lands. For the first time, in 1851, at the Great Exhibition, the public had the opportunity of contemplating side by side the productions of most of the British colonies and dependencies; and when that great gathering of specimens from all climes was broken up, it appeared desirable to retain and group together at least a few samples of those mineral substances which had either already attracted notice, or which deserved attention and farther development.

Several cases are, therefore, devoted in this Museum to the exhibition of minerals contributed for this object by various officials and private gentlemen, who have been engaged in the government or in the exploration of the several countries.

The wonderful gold production of Australia is illustrated partly in wall-case No. 38, and partly in the pedestal-case No. 11 (west side of Museum), and the more recent discoveries of British Columbia in wall-case No. 41.

The Copper ores of South Australia are derived from the rich mines of Burra Burra, Kapunda, Wallaroo, Worthing, and from numerous others now in a condition of prosperous activity; those of New South Wales from several mines in the county of Bathurst, which appear to be not yet fully developed. The Cape of Good Hope is noticeable for the series of rich specimens from Namaqualand, and Canada for the Copper ores of several localities now in work, and for numerous other useful minerals, which have been collected and described by Sir William Logan for the International Exhibition.

The mineral products of India can only be represented in a fragmentary form, but, in addition to metallic ores obtained from various sources, there will be found a series of non-metallic mineral substances of great commercial importance, such as the *kunkur*, used for cement, and the corundum, largely imported into Europe for polishing and grinding purposes. The gems,—diamond, ruby, sapphire, &c., the productions of the peninsula and of Ceylon, are exhibited in the horse-shoe case.

Australia.

WALL-CASE 37.

Shelf I.

1. Mass of NATIVE COPPER.
From the Burra Burra Copper Mines, South Australia.

2. RED OXIDE OF COPPER, with Blue and Green Carbonates.
Burra Burra Mines.
Presented by Messrs Graham and Hallett, from the Great Exhibition, 1851.

3. GREEN and BLUE CARBONATES OF COPPER.
Burra Burra.
Presented by Mr. Stevens.

Shelf II.

4 & 5. BLUE and GREEN CARBONATES OF COPPER.
Burra Burra.

6. Portion of a brecciated lode of GREEN CARBONATE OF COPPER,

the fragments cemented and coated with Blue Carbonate.
Burra Burra.
Presented by Mr. Stevens.

7. Blue and Green Carbonates of Copper.
Burra Burra.

8 & 9. Green Carbonate of Copper, with Black Oxide.
Burra Burra.

10. Red Oxide of Copper, with Green Carbonate.
Burra Burra.

Shelves III. & IV.

11 to 20. Specimens of Malachite, or Green Carbonate of Copper.
Burra Burra Mines.
Nos. 7 to 20 presented by the late Sir H. T. De la Beche.

Shelf V.

21. Malachite, polished.
Burra Burra.
Presented by R. Richardson.

22 to 27. Malachite.
Burra Burra.
Presented by Sir H. T. De la Beche.

28. Crystals of Azurite (Blue Carbonate of Copper), converted into Green Carbonate.
Burra Burra Mines.
Presented by Capt. Dalley, St. Austell.

29. Azurite, crystallized, with Chrysocolla, or Silicate of Copper.
Burra Burra.

30 & 31. Blue and Green Carbonates of Copper.
Burra Burra.

31 a. Crystal of Atacamite (*Oxychloride of Copper*).
Burra Burra.

Shelf VI.

32. Native Copper, with Red Oxide of Copper.
Burra Burra.

33. Blue and Green Carbonates of Copper, with Red Oxide, and Sulphide.
Burra Burra.

34. Green Carbonate of Copper, and Red Oxide.
Burra Burra.

35. Red Oxide of Copper, and Blue and Green Carbonates.
Burra Burra.
Nos. 30 to 35 presented by Sir H. T. De la Beche.

36. Copper Ore.
Belubula Mine, about 30 miles from Bathurst, South Australia.

Shelf VII.

37. Red Oxide of Copper, with Blue and Green Carbonates, and Veinstone formed of the brown slaty country.
Burra Burra, South Australia.

38. Blue and Green Carbonates of Copper.
Burra Burra.
Nos. 37 and 38 presented by Sir H. T. De la Beche.

39. Ingot of Copper.
Smelted from Burra Burra Ores.

40. Ingot of Copper.
Smelted from Australian Ores, by Napier's process.

Wall-case 38.

Shelf I.

41. Gossany Carbonate of Copper.
New Cornwall, South Australia.
Presented from the International Exhibition, 1862, by the Australian Commissioners.

42. Crystallized Carbonates of Copper.
Reedy Creek, South Australia.

43. Carbonates of Copper.
Kanmantoo Mines, Mount Barker, South Australia.

44. Copper Pyrites.
Kanmantoo Mines, Mount Barker, South Australia.

45. Copper Pyrites, iridescent from tarnish, with Hornblende Rock.
Worthing, Mount Barker District, South Australia.

46 & 47. Copper Glance, or Vitreous Copper Ore, with Green Carbonate.
Cumberland, South Australia.

Shelf II.

48. Blue and Green Carbonates of Copper, with Black Oxide.
Kirwan, South Australia.

49. Melaconite, or Black Oxide of Copper, with Copper Glance, and Iron Pyrites.
Wheal Dutton Lode, Kapunda, South Australia.

50. Copper Glance, with Green Carbonate of Copper.
Kapunda, South Australia.

51. Rich Copper Pyrites.
Kapunda.

52. Nodular mass of Black Oxide of Copper, with Blue and Green Carbonates.
Kapunda.

53. Bismuthic Copper Ore, containing 23·6 per cent. of Copper and 2·55 of Bismuth.
Stanley Mine, Northern District, South Australia.
Presented by A. P. Burtt.

54. Galena (*Sulphide of Lead*).
Cumberland, South Australia.
Nos. 45 to 52 and No. 54, presented, from International Exhibition, 1862, by the Australian Commissioners.

55. Galena.
Murchison River, Western Australia.
Transmitted by the Colonial Office.

56. Galena, Potter's Ore.
From a Mine, near Yass, New South Wales.

57 & 58. Hæmatite (*Anhydrous Peroxide of Iron*), from the surface.
About 12 miles from Goulburn, New South Wales.

59 to 61. Brown Iron Ore, with specimen of Coal employed in its reduction, and of Iron smelted therefrom.
Fitzroy Iron Mines, near Berrima, New South Wales.
Presented by H. Cole, C.B.

62. Granular Brown Iron Ore.
From near Geelong, Victoria.

Shelf III.

63. Brown Iron Ore, analysed by Mr. Daintree.
Australia.

64. Micaceous Iron Ore.
Adelaide, South Australia.
Presented by N. King.

65. Antimony Glance (*Sulphide of Antimony*).
From Mr. Osmond Gillie's Mine, South Australia.

65a. Molybdenite (*Sulphide of Molybdenum*), in Granite.
Perth, Western Australia.
Presented by A. R. C. Selwyn.

66. Stream Tin Ore, or "Black Sand."
Ovens District, near Melbourne, Victoria.
Presented by the late Major Danburghy.

67. Auriferous Stream Tin.
Ovens, Victoria.
One of the original specimens sent by Lieut-Governor La Trobe.
Presented by J. Mc Arthur.

68 & 69. Auriferous Stream Tin.
From the Victoria "Diggings."
Transmitted by the Colonial Office.

70 & 71. Two Ingots.
From the first ton of Colonial Tin, smelted from the Ore found at the *Ovens District, Victoria*, 1853, by Terry and Co., said to contain from 80 to 100*l.* worth of Gold per ton.
Presented by G. M. Stephens.

72. Ingot of Tin.
Smelted from the Ore of the *May Hill Gold Field, Ovens District, Victoria.*
Presented by Lieut.-Governor La Trobe.

73. Stalactite of Australian TIN.

74. Plate of TIN.
From Victoria.

Shelf IV.

75. BITUMINOUS SHALE, locally called "White Coal."
New South Wales.

76. COAL.
From Cape Patterson seams, Victoria.
Presented by W. H. Wathen.

77 & 78. QUARTZOSE CONGLOMERATES: Pebbles of vein Quartz, cemented by Oxide of Iron.
Bendigo, Victoria.

79. FERRUGINOUS QUARTZ VEINSTONE, termed "Burnt-quartz," obtained at a depth of 135 feet.
From a layer 3 inches thick on *the Pipe Clay Hills, Bendigo*, 1853.

80. Specimen showing the width of the QUARTZ LODE.
At Quartz Ledge Old Mine, Wentworth Gold Field, New South Wales.

81. QUARTZ VEINSTONE, showing impressions of large rhombohedral crystals.
Wentworth Gold Field.

82. Infusorial SILICEOUS EARTH.
Australia.
Presented by P. S. Hays, J.P., Tomki, Richmond R., N.S. Wales.
(On account of its size, this specimen is placed on the top shelf, case 37.)

N.B. The remaining specimens of Australian productions are arranged in the upright glass case No. 11, placed on the western side of the room, opposite to wall-case, No. 10.

New Zealand.

83. COPPER PYRITES, tarnished, with Purple Copper Ore.
Kawau Mine, near Auckland.

84. IRON SAND.
Mannkon Harbour, North Island.

85. MAGNETIC IRON SAND.
New Plymouth, or Taranaki, near Mount Egmont, North Island.
Presented by the New Zealand Company.

85 a. AURIFEROUS IRON SAND.
Molyneux R., Otago, New Zealand.
Presented by Dr. Bealey.

86. COAL.
New Zealand.
Presented by Captain Stokes.

87. COAL, with Resin.
Auckland.
Presented by Mr. Ridgway.
(On account of its size, this specimen is placed on the top shelf).

87 a. AURIFEROUS SAND, supposed to contain on the average about 2 oz. of gold to the ton.
River Hellyer, Tasmania.
Presented by the Van Dieman's Land Company, 1864.

PEDESTAL GLASS CASE, No. 11.

(West side of Museum).

Australia—*continued.*

88. DIAMOND, weighing $\frac{3}{4}$ carat.
Found at Ophir, West of Bathurst, New South Wales.
The first specimen brought to this country.
Presented by Lieut.-Col. Sir Thomas Mitchell.

89. SAPPHIRES and RUBIES.
Ophir, W. Bathurst.

90. SAPPHIRES, four specimens, supported on a card, with four specimens of ZIRCON.
Daylesford, Castlemaine District.
Presented, from the International Exhibition, 1862, by the Australian Commissioners.

91. TOPAZ, rolled.
New England Diggings.

92. AURIFEROUS SAND, composed of fragments of Topaz, Garnet, Spinel, and Zircon, with Native Gold.
From the Ovens, near Melbourne.
Collected and presented by J. B. Rollo, 1853.

93. Native Gold, in rhombic dodecahedral crystals.
Victoria.

94. Native Gold, crystallized.
Victoria.

95. Native Gold.
Fingal, Tasmania.
Nos. 94 and 95 presented by Dr. J. Milligan.

96. Native Gold, two "pepites," or nuggets, of unusual form.
Macquarie River, above its junction with the Turon, New South Wales.
Presented by Lord Wharncliffe.

97. Native Gold, nugget weighing 1 oz. 16 dwts.
Mount Alexander, Victoria.
Presented by E. Z. Dresden.

98. Fac-simile of the "Latrobe Nugget," a crystallized mass of Native Gold, weighing 23 oz. 9 dwts. Now in the British Museum.
Raised 1st May 1853, *at the Mac Ivor Diggings, Victoria.*

99. Model of the "Welcome Nugget," the largest known mass of Native Gold, weighing 2,166 ozs.
Found June 11th, 1858, *at Bakery Hill, Ballarat.*
It was melted on September 22d, 1859, and yielded pure gold 2,019$\frac{3}{4}$ ozs.; quartz, earthy matter, &c., 146$\frac{1}{4}$ ozs. Value of the gold, 8,376*l.* 10*s.* 10*d.*

100. Model of a Gold Nugget, weighing 27$\frac{1}{2}$ lbs.
Found at Forest Creek, Mount Alexander, Victoria.

101. Model of a Gold Nugget.
Found at Ballarat.

102 & 103. Auriferous Quartz.
Opossum Reef, Gordon, Victoria.

104 & 105. Auriferous Quartz, very fine, but solid.
Kangaroo Reef, Gordon, Victoria.

106. Auriferous Quartz, containing Gold associated with Brown Iron Ore.
Lone Star Reef, Gordon, Victoria.

107 & 108. Auriferous Quartz, with Iron Pyrites and Galena.
Boxing Reef, Steiglitz, Victoria.

109. Auriferous Quartz.
Homeward Bound Reef, Gordon, Victoria.
In this reef the gold occurs chiefly free in cavities.

110. Auriferous Quartz.
Parker's Reef, Gordon, Victoria.

111. Auriferous Quartz, sample of "Face Gold." Very light and floury, difficult to treat mechanically, without considerable loss of gold.
Little Hill Reef, Egerton, Victoria.
The above series, Nos. 102 to 111, presented by W. M. Brown.

112 & 113. Two large specimens of rich Auriferous Quartz.
Bendigo, Victoria.
Presented from the Paris Exhibition, 1855.

114. Auriferous Quartz.
Hanging Rock Diggings, N. S. Wales.

115 & 116. Opaque or milky Quartz, very rich in visible Gold.
Australia.

117. Portion of a partially vitrified Brick, taken from a furnace under a boiler at the
Albany Steam Mills, W. Australia.
It contains several globules of gold, derived either from the sand or clay, from the Murray River Flat, in the neighbourhood of Albany, used in making the bricks, all of which were found to contain gold.
Presented by G. Hanbury, M.L.C.

118. Native Gold, with Quartz and Clay.
Ballarat.

119. Native Gold, on Brown Iron Ore.
Anderson's Creek, near Melbourne.

120. Auriferous Detritus, termed in the district "Pipe clay," with fragments of Vein Quartz.
Ballarat, Victoria.
Presented by J. McArthur.

121 to 124. Native Gold, in indurated clay, termed "pipe clay."
Australia.

125 & 126. Slabs of Clay, from 180 feet below surface.
Diggings at the Rock River, Armidale, New South Wales.

127. Native Gold, in Quartzose Conglomerate.
Tambaroora, New South Wales.
Presented by G. J. Lyons.

128. Auriferous Gravel, containing about 30 ozs. of Gold to the ton.
Ballarat.
Presented by E. W. Binney.

129 & 130. Quartzose Gravel, with remains of Wood, from a deposit overlying the Auriferous Gravel, and beneath a flow of basaltic lava.
Creswick's Creek, Victoria.

131. Carbonized Cones of the *Banksia*, or "Australian Honeysuckle" (*Proteaceæ*), from the same deposit as No. 130.
Creswick's Creek.

132. Large cavernous specimen of mammillated Malachite, or Green Carbonate of Copper.
South Australia.

133. Large mass of Red Oxide of Copper, coated with the Green and Blue Carbonates. A splendid example of the rich ores found in the earlier workings.
Burra Burra Copper Mines, South Australia.
Presented from the Great Exhibition, 1851, by Messrs. Graham and Hallett.

(This specimen occupies the lower part of the case).

East Indies.

Wall-case 38.

Shelf V.

Nos. 134 to 167. A series of specimens illustrating the varieties and adulterations of *Corundum*, presented.

134. Corundum, in large crystals.
From near Cuddoor, Nuggur Division.

135. Corundum, in small crystals.
Near Cuddoor.

136. Corundum, in hexagonal crystals.
Near Cuddoor.

137. Corundum, in pyramidal crystals.
Near Cuddoor.

138. Corundum, in barrel-shaped crystals.
Near Cuddoor.

139. Corundum, in tabular crystals.
Near Cuddoor.

140. Corundum, in quadrilateral crystals.
Near Cuddoor.

141. Corundum, in small red crystals.
Secunderabad.

142. Corundum, red, crystalline.
Salem, Madras.

143. Corundum, grey, tabular.
Near Cuddoor.

144. Corundum, clove-brown, tabular.
Salem.

145. Corundum, pink, tabular.
Salem.

146. Corundum, green.
Salem.

147. Corundum, green, crystalline.
Near Cuddoor.

148. Corundum, blue, crystalline, the matrix of the sapphire and spinel.
Near Cuddoor.

149. Corundum, the matrix of the sapphire.
Near Cuddoor.

150. Corundum, red, with red Felspar and Iron, the matrix of the ruby.
Salem.

151. Corundum, purple, passing into Zircon.
Salem.

152. Corundum, largely mingled with Lime.
Salem.

153. Corundum, granular, largely contaminated with Lime and Sandstone.
Salem.

154. Corundum, contaminated with Lime, Mica, Quartz, Felspar, Fibrolite, and Iron.
Salem.

155. Corundum, decaying, contaminated with Lime.
Near Cuddoor.

156. Nodular Lime containing crystals of Corundum.
Near Cuddoor.

157. Green Felspar, often mistaken for Corundum.
Salem.

158. Green Fibrolite, often mistaken for Corundum.
Salem.

159. Corundum, dark coloured, passing into Emery.
Near Cuddoor.

160. Emery, enclosing a crystal of Corundum.
Salem.

161. Emery, massive.
Salem.

162. Emery, crystalline.
Salem.

163. Emery, stratified.
Salem.

164. Emery, steel-grey.
Salem.

165. Emery, second quality.
Salem.

166. Emery, passing into Basalt.
Salem.

167. Iron Stone, passing into Emery.
Streperematoor.

168. Corundum, or Adamantine Spar, in large hexagonal crystals.
Southern Ghauts, Mysore.
Presented by the late Dr. Buist, Bombay.

Shelves VI. & VII.

169 to 200. A series of specimens illustrating the Iron manufacture of India.
Presented from the Great Exhibition, 1851.

Wall-case 39.

Shelf I.

201. Coal.
From Tertiary deposit, near Nagpur, Central India.
Presented by Lieutenant Sankey.

202. Carbonaceous Shale.
Lenya River, Mergui River, Province of Tenasserim.
Presented by General Tremenheere.

203 to 205. Three specimens of Surface Coal.
Labuan.
Presented by the Eastern Archipelago Company.

Shelf II.

206. Carbonate of Iron.
Mysore.
Presented by Allan Hume.

207. Micaceous Iron Ore.
India.
Presented by the Honourable East India Company.

208 & 209. Magnetic Iron Ore.
Tavoy.

210. Iron Ore.
Tavoy.
Nos. 208 to 210 presented by General Tremenheere.

211. Hæmatite.
India.
Presented by Major Drummond.

212 & 213. Copper Ores.
From the Nellore and Vencatygherry Provinces.
Presented by the East India Company.

214. Large-grained Granite, or Pegmatite, containing Tinstone.
Kahan Hill, near Mergui, Tenasserim.

215. Antimony Glance.
Moulmein.
Nos. 214 & 215 presented by General Tremenheere.

Shelf III.

216. Magnetic Iron Ore, in octohedral crystals.
Salem, Madras.
Presented by the late R. Phillips, F.R.S.

217. Iron Sand.
India.

218. Iron Sand.
Chinnarayan.

219. Ochrey Iron Ore.
India.

220. Ochrey Iron Ore.
Gujina Guta.

221. Ochrey Iron Ore.
Doray Guda.

222. "Wootz" Iron Ore, employed for the manufacture of the famous Wootz steel.
India.

223. "Wootz," or Indian Steel.
Nos. 217 to 223 presented by the East India Company.

224. Wootz Steel.
Presented by Major Douglass, Bengal Artillery.

Shelf IV.

225. Cleavelandite, or Albite Felspar, passing into Kaolin.
Vizianagrum.

226. Pegmatite, a variety of Granite, passing into Kaolin.
Vizianagrum.

227. Kaolin, or China Clay.
Vizianagrum.

228. Kaolin.
Salem.

229. Kaolin.
Arcot.

230. Kaolin.
Bangalore.

231. Kaolin, lemon-yellow.
Bangalore.

232. Kaolin, flesh-coloured.
Bangalore.

233. Kaolin, greenish.
Bangalore.

234. Kaolin, reddish.
Salem.

235. Magnesian Kaolin.
Bangalore.

236. Magnesian Kaolin, brown.
Bangalore.

Shelf V.

237. Aluminous Kaolin.
Beder.

238. Siliceous Kaolin.
Maliangoolum.
This yields a very gelatinous white clay.

239. Marl, grey.
Red Hills, near Madras.

240. Marl, red.
Red Hills.

241. Marl, dark red.
Bazar.

242. Marl, buff-coloured.
Salem.

243. Ochre, purple.
Bazar.

244. Ochre, purple.
Bangalore.

245. Ochre, orange-coloure
Bangalore.

246. Ochre, lavender-coloure passing into Tripoli.
Bellary.

247. Ochre, stone-coloured.
Red Hills.

248. Ochre, yellow.
Chingleput.

249. Ochre, yellow.
Cuddapah.

250 Ochre, yellow.
Madras.

251. Ochre, yellow magnesian, first quality.
Bazar, Madras.

252. Ochre, yellow magnesian, second quality.
Bazar, Madras.

253. Ochre, yellow magnesian, third quality.
Bazar, Madras.

254. Raw Sienna.
Red Hills.

255. Burnt Sienna.
Red Hills.

256. Raw Umber.
Red Hills.

257. Burnt Umber.
Red Hills.

258. Light Red.
Chingleput.

259. Light Red.
Madras.

260. Venetian Red.
Madras.

261. Indian Red.
Red Hills.

262. Indian Red.
Madras.

263. Ironstone, Indian red.
Hills, near Vizianagrum.

264. Ironstone, purple, ochrey.
Streeperematoor.

265. Ironstone, purple, ochrey.
Red Hills.

266. Ironstone, lavender-coloured, ochrey.
Red Hills.

267. Ironstone, variegated, ochrey.
Red Hills.

268. Iron Ore, purple.
Sondoor Hill, near Bellary.

269. Hæmatite, purple.
Red Hills.

270. Hæmatite, or Reddle.
Red Hills.

271. Wad, Oxides of Manganese and Iron.
Red Hills.

272. Manganese Black.
Red Hills.

The above series, Nos. 225 to 272, presented from the Great Exhibition, 1851.

Shelf VI.

273 to 279. Specimens of Indian Iron Ores.

280. Specimens of Indian Steel.
From Madras.

Shelf VII.

281. Magnetic Iron Ore.
Salem, Madras.

Presented by General Monteith.

282. Magnetic Iron Ore.
Salem.

Presented by Richard Phillips.

283 & 284. Magnetic Iron Ore.
Tavoy.

285 & 286. Iron Ore.
Tavoy.

Nos. 283 to 286 presented by General Tremenheere.

287. Magnetic Iron Ore.
India.

288 & 289. Brown Iron Ore.
India.

Nos. 287 to 289 presented by the East India Company.

Wall-case 40.

Shelf I.

290. Apophyllite (*Hydrous Silicate of Lime and Potash*), in unusually large crystals.
From the Tunnels on the Bhore Ghaut Incline, between Bombay and Poonah.

291. Scolecite (*Hydrous Silicate of Alumina and Lime*), with Apophyllite.
From the Bhore Ghaut Incline.

Nos. 290 and 291 presented by J. C. Tate.

292. Stilbite (*Hydrous Silicate of Alumina and Lime*) with Apophyllite.
From the Bhore Ghaut.

Presented by the late Dr. Buist.

Shelf II.

293. Slab of dark green Serpentine.
Goomlong, S. bank of Brahmaputra R., N.E. Assam.

293a. Steatite, small carved slab.
Delhi.

Presented by Capt. Toynbee.

294 & 294 a. Two slabs of Marble.
Bellary.

From the Commissary General, Madras.

295 & 296. Crystalline Rock Salt.
Mines at the Salt Range Hills, near the Indus.

297. Bombay Salt, first quality, from the upper surface of the salt-pan. Accidentally coloured by being brought home in a tin-canister, otherwise of snowy whiteness and great purity.

298. Bombay Salt, second quality, from the second coating of the salt-pan. Accidentally coloured by the tin-canister in which it was brought home.

299. Bombay Salt, third quality, from the bottom of the salt-pan. Contains a small trace of mud.

300. Kunkur, a fresh-water limestone, occurring in concretionary forms, and extensively used in India for making lime, cements, &c.
Presented by the late Dr. Buist.

301. Magnesite (*Carbonate of Magnesia*).
Salem, Madras.
Presented by General Monteith.

302. Graphite, Plumbago, or Black-lead.
Ceylon.
Presented by H. F. Blanford.

Shelf III.

303. Coal.
Bank of the Great Tenasserim River, Mergui Province.
Presented by General Tremenheere.

304. Chrome Iron Ore, as imported from *Madras.*
Presented by E. F. Teschemacher.

305. Chrome Iron Ore.
Salem, Madras.

306. Brown Iron Ore.
Doray Guda.

307. Iron Sand, containing Gold.
Southern Mahratta Country, Bombay Presidency.

308. Tin Ore.
Kahan Hill.

309. Stream Tin Ore.
Yahmon, on the Southern side of the Tenasserim River.

310. Stream Tin Ore.
Tabouleik Khyoung River, Little Tenasserim.
Nos. 308 to 310 presented by General Tremenheere.

311. Detritus of Stanniferous Granite.
Tin Mines of Banca.

312. Tin.
Doonian Toongal, Malacca.

British America.

Shelf IV.

313. Purple and Grey Copper Ore, coated with Green Carbonate.
From near the surface, Harvey Hill Copper Mines, Leeds Megantic, Canada East.
Presented by Herbert Williams.

314. Purple and Grey Copper Ore.
From 25 fathoms below the surface, Harvey Hill Copper Mines.
Presented by Herbert Williams.

315. Galena (*Sulphide of Lead*).
Poole's Lead, Lansdowne, Canada West.

316. Augite, with Wollastonite (*Silicate of Lime*).
North Burgess, Lanark County, Canada West.

317. Mica.
North Burgess, Lanark Co.
Nos. 315 to 317 presented by F. Poole.

318 to 320. Graphite, or Plumbago.
Grenville, on the Ottawa, Canada.

Shelf V.

321 & 322. Apatite (*Phosphate of Lime*), large green crystals, with Mica, imbedded in pink Carbonate of Lime.
Canada.

323. Mica, bronze coloured crystal in very large six-sided plate.
Grenville, Canada.

324. Steatite, or Soapstone.
Canada.

325. Dolomite (*Carbonate of Lime and Magnesia*), with Silver Mica.
High Falls, Canada.

326. Copper Pyrites, containing 0·5 per cent of Cobalt.
Elizabeth Town, near Brockville, Canada.

Shelf VI.

327. Peristerite, a variety of Albite-felspar (*Silicate of Alumina and Soda*).
Bathurst, Canada.

328. Asbestos.
Canada.
Nos. 318 to 328, presented by Sir William Logan, Director of the Geological Survey of Canada.

329. Copper Pyrites, with Purple Copper Ore.
Bruce Mines, Lake Huron.

Shelf VII.

330. Purple Copper Ore, or Bornite, with Copper Pyrites.
Bruce Mines, Lake Huron.

331. Copper Pyrites.
Bruce Mines.
Nos. 330 & 331 presented by Sir W. Logan.

332. Copper Pyrites.
Bruce Mines, Lake Huron.
resented by Mr. Saunders.

Wall-case 41.

Shelf I.

333 & 334. Peristerite, a variety of Albite-felspar (*Silicate of Alumina and Soda*).
Bathurst, Canada.

335. Perthite, a variety of Orthoclase-felspar. (*Silicate of Alumina and Potash*).
Perth, Canada.

336. Bituminous Shale, yielding from 3 to 4 per cent of tarry oil.
Collingwood, Canada.

337. Fossiliferous Limestone from which the Petroleum or Rock-oil arises. (Corniferous Limestone, Devonian).
Enniskillen, Canada.
Nos. 333 to 337 presented by Sir William Logan.

Shelf II.

338. Native Copper, crystallized.
British Possessions, Lake Superior.
Presented by the late T. H. Henry, F.R.S.

339. Fossiliferous Iron Ore.
Anapolis Bay, Nova Scotia.
Presented by Sir W. Logan.

340. Micaceous Iron Ore.
Nova Scotia.
Presented by C. D. Archbold.

341. Micaceous Iron Ore.
Nova Scotia.
Presented by Mr. Ross.

342. Auriferous Quartz, locally termed "Barrel Quartz."
Laidlaw, 10 miles from Halifax, Nova Scotia.
Presented by the Secretary of State for the Colonies.

343. Albertite, a bituminous mineral allied to Cannel, extensively used in New York for the manufacture of gas.
Albert Mines, Hilsborough, New Brunswick.
Presented by N. Gould.

344. Black Coal-Shale or Bass.
New Brunswick.

345 & 346. Sulphide of Copper, covered with Green Carbonate, penetrating and intermingled with Anthracite.
New Brunswick,
Presented by the Directors of the Gloucester Mining Company, New Brunswick.

347. Galena (*Sulphide of Lead*).
From the Lead Mine, worked by the Telegraph Company, near Placentia Bay, Newfoundland.

348. Copper Ore, containing 16·7 per cent. of Copper, with Silver and Gold.
Clarendon, Jamaica.

Shelf III.

349 & 350. Lignite, or Brown Coal.
Jamaica.

351 to 355. Copper Pyrites.
Mount Vernon Copper Mine, St. David's, Jamaica.
Presented by the Colonial Office.

356 & 356a. Copper Pyrites.
Jamaica.

357. Copper Pyrites, with Purple Copper Ore.
Jamaica.

358. Copper Pyrites, with Black Oxide of Copper.
Jamaica.

359. Cobalt Bloom (*Arseniate of Cobalt*).
Port Royal Mountains, Jamaica.
Presented by Robert Taylor.

360. Native Copper.
Virgin Gorda Copper Mines, Island of Virgin Gorda, West Indies.
Presented by the Directors of the Mining Company, 1842.

361. Molybdenite (*Bisulphide of Molybdenum*).
Virgin Gorda Copper Mines.
Presented by the Directors, 1842.

Shelf IV.

362. Clay Ironstone (*Argillaceous Carbonate of Iron*).
Vaucouver Island.

363. Clay Ironstone, with veins of Calcite, and Coal attached.
Vaucouver Island.

364. Molybdenite (*Bisulphide of Molybdenum*)
Fraser River, British Columbia.

365. Native Arsenic, in Calcite.
Silver Island, Queen Charlotte Island.

366. Copper Pyrites, with Purple Copper Ore, and Zinc Blende.
Skincuttle Island, Queen Charlotte Island.

367. Specimens from a Copper Vein.
Burnaby Island, Queen Charlotte Island.

368. Copper Pyrites.
Salmon River, Skid-du-gates Straits, Queen Charlotte Island.

369. Copper Pyrites.
Jeffry Island, Queen Charlotte Island.

370. Copper Pyrites, with Sulphate of Copper.
George Island, Queen Charlotte Island.

371 & 372. Magnetic Iron Ore.
Harriet Bay, Queen Charlotte Island.

373. Slate, from which the Indians make their pipes.
Queen Charlotte Island.
Nos. 365 to 373 presented by F. Poole.

Shelf V.

374. Native Gold, with Quartz.
Queen Charlotte Island.
Presented by the Lords of the Committee of Privy Council for Trade.

375. Native Gold.
Cariboo Country, British Columbia.

376. Native Gold.
Fort Alexander, British Columbia.

377. Native Gold.
Canoe, British Columbia.

378. Native Gold.
Bridge River, British Columbia.

379. Native Gold and Silver.
Bridge River.
Presented by Mr. Davidson.

380. Native Silver and Copper.
Bridge River.
Presented by Mr. Davidson.

381. Native Gold.
Fountain, British Columbia.

382. Native Gold.
Lilooet, British Columbia.

383. Native Gold, with Quartz.
Lilooet Lake.

384. Native Gold.
Lilooet River, beyond the Lake.

385. Native Gold.
Thompson River, British Columbia.

386. Native Gold, a nugget weighing 7 oz. 13 dwt. 7 grs.
From the Head Waters of the Thompson River, British Columbia.
Deposited by His Grace the Duke of Newcastle.

387. Native Gold.
Similkameen River, East side of Cascade Mountains, N. A. Boundary Line.
Presented by Dr. Hector.

388. Native Gold.
Vancouver Island.
Most of the above specimens of British Columbian gold, were deposited by the Secretary of State for the Colonies.

389. Polished section of a Conglomerate, with pebbles of Quartz and Jasper.
From the Shores of Lake Superior, Canada.

390. Peristerite, polished.
Bathurst, Canada.

Shelf VI.

391. Perthite, a variety of Orthoclase-felspar.
Perth, Canada.

392. Chrome Iron Ore, with Serpentine.
Canada.

393. Chrome Iron Ore.
Ham, Canada.

Shelf VII.

394. Ilmenite, or Titaniferous Iron, with Rutile.
Bay Saint Paul, Canada.

395. Bog Iron Ore.
Pontneuf, Canada.

395 a. Portion of a Railway Wheel, made of Cast Iron.
Smelted from brown iron ore, at the *Radnor Forges, Batiscan, Canada*, and reputed to possess great strength and durability.

Wall-case 42.

Shelf I.

396 & 397. Carbonate of Magnesia.
Bolton, Canada.

398. Steatite, or Soapstone.
Canada.
Nos. 389 to 398 presented by Sir W. Logan.

(The remaining Canadian specimens, on account of their size, are placed on the lower shelves).

South Africa.

Shelf II.

399. Copper Gossan.
Springbokfontein, Little Namaqualand.

400 & 400 a. Hydrated Silicate of Copper, and Red Oxide.
Springbokfontein.

401. Red Oxide of Copper, with Arseniate of Copper.
Springbokfontein.

402. Hydrated Silicate of Copper, with Black Oxide.
Springbokfontein.

403. Black Oxide of Copper.
Wheal Julia, Concordia, Little Namaqualand.

404. Red Oxide of Copper, or Tile Ore.
Springbokfontein, Little Namaqualand.

405. Copper Pyrites, with Calcite, and Hornblende Rock.
Andrew's Shaft, Maitland Mines, Little Namaqualand.

406. Copper Pyrites.
Zincefordein, Little Namaqualand.

407 & 408. Copper Pyrites, tarnished.
Wheal Hester Maria, Concordia, Little Namaqualand.

409 & 410. Copper Pyrites.
Walwich Bay.

411. Copper Pyrites, with Black Oxide.
Kodas, Little Namaqualand.

Shelf III.

412. Copper Pyrites, with iridescent tarnish.
Wheal Alfred, Little Namaqualand.

413. Copper Pyrites, with Purple Ore.
Tweefontein, Little Namaqualand.

414 & 415. Purple Copper Ore, Bornite, Erubescite, or Buntkupfererz.
Spectacle, Little Namaqualand.

416. Purple Copper Ore, in schist.
Kodas, Little Namaqualand.

417. Purple Copper Ore.
Numies, Little Namaqualand.

418. Copper Pyrites, and Purple Ore.
Wheal Alfred, Little Namaqualand.

Shelf IV.

419 & 420. Chrysocolla (*Hydrous Silicate of Copper*).
Spectacle, Little Namaqualand.

421. Chrysocolla, with Red Oxide of Copper.
Karap, Little Namaqualand.

422. Chrysocolla, blue.
Karap.

423. Chrysocolla, blue.
Wheal Julia, Little Namaqualand.

424. Chrysocolla.
Spectacle.

425. Chrysocolla.
Springbokfontein.

Shelf V.

426 & 427. Copper Glance, or Vitreous Copper Ore.
Kodas, Little Namaqualand.

428. Copper Glance.
O'rekip, Little Namaqualand.

429. Grey Copper Ore, compact.
Kodas.

430. Purple and Grey Copper Ore.
10-*fathom level, Kodas.*

431. Fragments of Quartz, cemented by Copper Ore.
Bell Mine, Orange River.

432. Carbonate of Copper, on felspathic rock.
Little Namaqualand.

433. Carbonate of Copper, "indication," in Mica Schist.
Ooghrahis, Little Namaqualand.

434. Strings of Silicate of Copper.
Springbokfontein.

435. Red Oxide of Copper, with Arseniate of Copper.
Springbokfontein.

436 & 437. Atacamite (*Oxychloride of Copper*), crystallized.
Tweefontein, Little Namaqualand.

438. Cuprite, or Red Oxide of Copper, in cubic crystals, on Native Copper.
Walwich Bay.

439. Brown Iron Ore.
Mossel Bay.

440. Coal, altered by contact with a Trap rock.
Stormberg.

441. Molybdenite (*Bisulphide of Molybdenum*).
Hester Maria, Namaqualand.

442. Crocidolite (*Hydrous Silicate of Iron, Magnesia, and Soda*).
Griqualand.

443. Kyanite (*Silicate of Alumina*).
Cape of Good Hope.

444. Epidote, crystallized.
Namaqualand.

The above South African specimens, Nos. 399 to 444, presented by A. Wyley, late Geological Surveyor to the colony.

445. Corundum.
Steinkopf, Namaqualand.

446. Felspar.
Umtvalami River.

447. Coal.
Port Natal.

Nos. 446 & 447 presented by Captain Garden.

Canada—*continued.*

448. Psilomelane, Manganese Ore.
De Toils Kloof, about 45 miles E.N.E. of Cape Town.

Shelf VI.

449 to 451. Three specimens of Chrome Iron Ore.
Bolton, Canada.

Shelf VII.

452. Magnetic Iron Ore.
Madoc, Canada.

453. Magnetic Iron Ore.
Marmora, Canada.

454. Dolomite (*Carbonate of Lime and Magnesia*).
Canada.
Nos. 449 to 454 presented by Sir W. Logan.

455. Specular Iron Ore (*Anhydrous Peroxide of Iron*), crystallized.
Ascension Island.
Presented by Lieutenant McArthur.
This magnificent specimen stands under a glass shade, on a small table, placed at present on the opposite side of the room.

NON-METALLIC MINERALS.

Horse-shoe Case.

The discoveries of modern chemistry which have unveiled the true character of composition of many of the stony and sparry minerals, greatly modify the old distinction between metallic and non-metallic substances. But there is a certain convenience in adhering to the division recognized by the world at large, and in classing apart from the ores which yield the ordinary heavy metals of commerce those salts or oxides which in spite of a mere stony aspect are now known to contain one or other of the light metals, as sodium, aluminium, or magnesium. This great division of inorganic bodies includes those which are commonly described as earths, salts, stones, spars, gems, and inflammables. Very numerous as they are, a great proportion of these minerals render important services to man, whilst along with them, either associated in their occurrence, or forming the natural links between separate kinds, are many for which no actual use has yet been devised. It is not the object of the present collections to rival the British Museum in the exhibition of every species and variety which has been established by scientific description; but, whilst the chiefly important minerals are duly represented, especial prominence has only been given to those kinds which are applied to useful purposes.

Case A.

Carbon.

The group of minerals which are composed chiefly of carbon, begins with the purest display of that element in the diamond, and in graphite, and includes the whole range of the coals, cannels, and lignites, in which besides the gases hydrogen, oxygen, and nitrogen, very variable quantities of earthy or stony matter, forming ash, are mingled in the

composition. And the same group admits of the addition of a numerous class of substances, of an inflammable character, partaking more or less of the nature of mineral pitch and resins.

Nos. 1 to 11. A series of Specimens illustrating the mode of occurrence of the DIAMOND, its varieties of colour, its uses, and the methods of cutting and polishing.

From Brazil.
Presented by E. Z. Dresden.

1. CASCALHO, a gravel composed of quartz pebbles with ferruginous clay, and according to its constituents considered an indication of the presence of diamonds.

2. CARBONADO, an amorphous variety of diamond: two pieces, weighing 16 grains.

3. BORT or BOORT, weighing $7\frac{1}{2}$ grains, a dark and confusedly crystalline variety of diamond, valuable as a polishing material.
Brazil.

4. Pure DIAMOND POWDER, weighing 12 grains.

5. Part of a ROUGH DIAMOND ("diamantina quality"), weighing $7\frac{1}{4}$ grains, split from a stone in consequence of an imperfection.

6. Splintered ROUGH DIAMOND, weighing $5\frac{1}{4}$ grains.

7. Two small DIAMONDS, used by glaziers for cutting glass.

8. Four ROUGH DIAMONDS, weighing 12 grains.

9. Six ROUGH DIAMONDS, weighing 13 grains.
From the Sincura Mines, Province of Bahia.

10. ROUGH DIAMOND, weighing $3\frac{1}{4}$ grains, the four points of which have been cut, being the first stage in the process of cutting before polishing.

11. Five CUT DIAMONDS, of which four are Brilliants, and one Rose cut.

12. TABLET supporting six natural crystals of DIAMOND.
Brazil.

13. BLACK DIAMOND, cut as a brilliant.

14. BORT, or "Diamond of Nature," an impure variety used for drilling, polishing, &c. This specimen is fractured to exhibit its radiated internal structure.
Brazil.

15. CARBONADO, or "Carbonate," an amorphous variety of diamond, used for drilling, &c.
Brazil.
Presented by J. Moring.

16. TABLET supporting six MODELS in paste, to illustrate the forms in which gems are cut, viz.:—

1 and 2. Brilliants.
3 and 4. Roses.
5. Table.
6. Cabochon.

17. Models of the KOH-I-NOOR and Pendants, as exhibited in the Great Exhibition, 1851. Weight of the Koh-i-noor, $186\frac{1}{16}$ carats.

18. Models of the KOH-I-NOOR and Pendants, in their present state. Weight of the Koh-i-noor, $102\frac{1}{2}$ carats (*Tennant*).

19. Model of the blue HOPE DIAMOND, in the collection of the late Mr. P. H. Hope, weighing 177 grains (*Hertz*), and valued at 30,000*l.*

20. Model of the ORLOFF, or GRAND RUSSIAN DIAMOND, weighing $194\frac{3}{4}$ carats (*Kluge*). Sold for about 90,000*l.* and an annuity of 4,000*l.* (*Mawe*).

21. Model of the AUSTRIAN, MAXIMILIAN, or GRAND TUSCAN DIAMOND, weighing $139\frac{1}{2}$ carats (*Kluge*), and valued at 109,250*l.* (*Feuchtwanger*).

22. Model of the REGENT, PITT, or ORLEANS DIAMOND, weighing 136⅞ carats (*Barbot*), and valued at 125,000*l.* (*Dana*).

23. Model of the NASSUCK DIAMOND, weighing 89¾ carats (*Kluge*), now in the possession of the Marquis of Westminster. Sold by auction, 20th July 1837, for 7,200*l.*

24. Model of the PIGOT DIAMOND, weighing 82¼ carats (*Kluge*), and valued at 40,000*l.*

25. Model of the SANCY DIAMOND, formerly amongst the French crown jewels, and subsequently in the possession of the Demidoff family. Weight, 33¾ carats (*Barbot*). Said to have been sold, in 1835, for 500,000 silver roubles.

26. Model of a DIAMOND said to have been in the hilt of a sword worn by Bonaparte.
Presented by the late H. J. Brooke, F.R.S.

27 and 28. GRAPHITE, Plumbago, or "Black Lead."
Borrowdale, Cumberland.
Presented by the late W. E. Brockedon, F.R.S.
(No. 28 is placed in the case underneath.)

29. GRAPHITE.
I. of Mull, Scotland.
Presented by F. B. Pentland.

30. GRAPHITE.
Grampound, Cornwall.

31. GRAPHITE, embedded in "elvan," or porphyry, and unconnected with any vein or lode.
Cornwall.
Presented by J. S. Enys, F.R.S.

32. GRAPHITE, crystallized, in calc spar, with chondrodite, and pargasite.
Ersby, Pargas, Finland.

33 to 35. GRAPHITE.
From the Alibert Mines, Government of Irkutsk, Eastern Siberia.

36. GRAPHITE, in crystalline calcite.
Alibert Mines, E. Siberia.

37 to 40. GRAPHITE, worked into ornamental forms.
Alibert Mines, E. Siberia.
Nos. 33 to 40 presented from the International Exhibition, 1862, by M. Alibert.

41. GRAPHITE.
Nijnei Tunguski, E. of Turukansk, R. Yenisei, Siberia.

42. GRAPHITE, worked into a sphere.
Nijnei Tunguski.
Nos. 41 and 42 presented by M. Siderov.

43. GRAPHITE.
Greenland.
Presented by James Davidson of Leith.

44. GRAPHITE.
Omenak, W. Coast of Greenland.
Presented by Jacob Lundt.

45. GRAPHITE.
Upper California.
Presented by the late W. E. Brockedon.

46. GRAPHITE.
Vancouver Island.
Presented by Dr. Hector.

47 and 47a. GRAPHITE.
Grenville, Canada.
Presented by Sir W. E. Logan.

48. GRAPHITE.
New Brunswick.

49. GRAPHITE.
Travancore, East Indies.
Presented by Dr. Royle.

50. GRAPHITE.
Ceylon.
Presented by the late W. E. Brockedon.

51. GRAPHITE.
Ceylon.
Presented by H. F. Blanford.

52. GRAPHITE.
Ceylon.
Presented by the Committee in Ceylon for furthering the objects of the International Exhibition, 1862.
(Placed in the case underneath.)

53. GRAPHITE, in pieces prepared for the manufacture of black lead pencils.
Borrowdale, Cumberland.

54. GRAPHITE, cut for manufacturing into pencils.
Borrowdale.
Presented by Messrs. Brookman and Langdon.

55. Leads for pencils, of Borrowdale GRAPHITE.
Presented by Messrs. S. Mordan & Co.

56 and 56a. GRAPHITE, compressed into blocks.

57. COMPRESSED GRAPHITE, "Brockedon's patent pure Plumbago."
Nos. 56 to 57 presented by the late W. E. Brockedon, F.R.S.

58. A series of Specimens illustrating the manufacture of a BLACK LEAD PENCIL.
Presented by Messrs. S. Mordan & Co.
1. Blank, or bottom of Cedar.
2. Bottom grooved for insertion of lead.
3. Bottom with slice of lead, showing mode of insertion.
4. Bottom filled with lead ready for glueing.
5. Top, a thin piece of cedar, which, with the bottom, completes the pencil.
6. Pencil ready for turning, formed of the top and bottom glued together.
7. Pencil partially turned.
8. Pencil, turned and finished.

59. TWO PENCILS, made from the GRAPHITE of the W. Coast of Greenland.
Presented by J. Lundt.

60. ARTIFICIAL GRAPHITE, with cyano-nitride of Titanium.
From a mass weighing about 10 tons, from the bear of a blast furnace at Bilston, South Staffordshire.
Presented by S. H. Blackwell, F.G.S.

61. ARTIFICIAL GRAPHITE, in slag, showing that where the slag comes in contact with the fuel the latter is coked.
From a blast furnace near Dudley.
Presented by Dr. John Percy, F.R.S.

62. ARTIFICIAL CRYSTALLINE GRAPHITE, or Kish.
From the Iron blast furnaces, Russell's Hall, Dudley.
Presented by S. H. Blackwell, F.G.S.

63. ARTIFCIAL GRAPHITE.
From the Iron furnaces of Mr. Dawes, Bromford, S. Staffordshire.
Presented by J. Dawes, F.G.S.

CASE B.

CARBON AND HYDRO-CARBONS.

64. ANTHRACITE, Glance Coal, Stone Coal, or non-bituminous Coal.
From the bed named the "brass vein," Cwm Twrch, Swansea, Glamorganshire, S. Wales.
Presented by the late Sir H. T. De la Beche, C.B.

65. ANTHRACITE.
From the Lower Silurian Slates, Laxey Mines, I. of Man, 110 fathoms deep, 1861.
Presented by W. W. Smyth, F.R.S.

66. ANTHRACITE, iridescent.
Eastern Pennsylvania, U.S.
Presented by C. J. La Trobe.

67. MINERAL CARBON, or 'Mother of Coal."

68. PEACOCK COAL, an iridescent bituminous Coal, provincially called "Moontons."
Rough Hill End, 3 miles N. of Rochdale, Lancashire.
Presented by E. Tayler.

69. COAL, exhibiting peculiar structure locally called "crystallized," or "cone-in-cone."
Merthyr Tydfil.
This structure is often observable in the excellent "free-burning" steam coals of South Wales.
Presented by Mr. Thornburn.

70. CONE-IN-CONE COAL.
Merthyr Tydfil, Glamorganshire.
Presented by W. Crawshay.

70a. Coal, exhibiting a peculiar conchoidal fracture often mistaken for woody structure.
From Mr. Charlesworth's pit, Rosehill, near Rawmarsh, Rotherham, Yorkshire.
Presented by Mr. Chadwick, 1864.

71. Exhibits the contact of Bituminous and Cannel Coal, the Cannel being the upper bed.
Incehall Colliery, Wigan, Lancashire.
Presented by W. W. Smyth, F.R.S.

72. Cannel, "Candle," or "Parrot Coal."
From a seam 2 feet 9 inches thick at the Collieries of the Earl of Crawford and Balcarres, at Haigh, near Wigan, Lancashire.
Presented by the late W. Peace.
(Placed in the case beneath.)

A fine block of Wigan Cannel Coal, presented by the Earl of Crawford and Balcarres from the International Exhibition, will be found in the Hall, near the eastern entrance to the Lecture Theatre.

73. Cannel Coal, with two surfaces naturally polished, being the sides of faults.
Preston Grange, Haddingtonshire.
Presented by Sir G. Grant Suttie, Bart.

74. Cannel Coal, brown.
Pirnie, Scotland.

75. Cannel Coal, black.
Pirnie.
Nos. 74 & 75 presented by E. Meldrum.

76. Albertite, a mineral allied to Cannel, used extensively in New York for making gas.
Albert Mines, Hilsborough, New Brunswick.
Presented by N. Gould.

77. Albertite.
Ben Wyvis, Dingwall, Parish of Kiltearn, Ross-shire.
Presented by the Rev. Dr. Honeyman.

78 and 79. Lignite, or Brown Coal.
Nassau.
Presented by the Department of Mines of the Grand Duchy of Nassau.

80. Lignite.
From the Meiocene beds of Bovey Tracey, Devonshire.

81. Lignite.
From the chalk, Kent.
Presented by Mr. Mackeson.

82. Lignite.
Tasmania.
Presented by Sir W. Denison.

Analysis by C. Tookey:—

Carbon	59·90
Hydrogen	4·66
Oxygen	15·99
Nitrogen	1·08
Sulphur	0·30
Ash	4·64
Water (hygroscopic)	13·43
	100·00

83. Lignite, lamellar.
Colditz, Saxony.

84. Jet. This mineral, the *Gagates* of the ancients, occurring stratified in the dark shales of the lower Lias, was found in England at a very early period, and was highly valued not only for ornaments, but for supposed medicinal virtues.
From the Lias shales of Whitby, Yorkshire.

85. String of Jet Beads.
Whitby.

86. Ancient Jet Ornament.
Found in England.
Presented by the late Mr. Hertz.

87. Torbane Mineral, or Torbanite, the so-called "Boghead Cannel Coal."
From the coal measures, Torbane Hill, Linlithgowshire.
Presented by J. H. Vivian, M.P.

88. Bituminous Marl.
New South Wales.
Presented by Dr. George Witt, F.R.S.
(Placed in the case beneath.)

89. Bituminous Shale, or "Kimeridge Coal," said to yield 9,050 cubic feet of gas to the ton.
Kimeridge Bay, I. of Purbeck, Dorsetshire.
Presented by V. Wanostrocht.
(Placed in the case beneath.)

90. KIMERIDGE COAL MONEY, circular discs of bituminous shale (Kimeridge Coal), apparently turned in a lathe, and frequently found buried in barrows, &c., in the

Isle of Purbeck, Dorsetshire.

Presented by Mr. Groves.

91. BITUMINOUS SUBSTANCE, containing 62 per cent. of volatile products.

Occurring in beds 6 feet thick close to the surface, about 50 miles S.W. of Bahia, near the right bank of the Acarahy River, and 20 miles from its mouth.

92. COMBUSTIBLE SUBSTANCE.

From a stratum of unknown thickness, but known to extend for miles on the banks of the Mersey, North side of Tasmania.

Presented by Sir W. Denison.

93. STRAW, carbonized in a coking-oven.

94. Pieces of PLAITED STRAW, CANE, &c., carbonized in a coking-oven.

Presented by J. Jameson.

95. FILAMENTOUS CARBON formed in coking coal in a coking-oven.

96 to 99. Specimens of COKE, exhibiting peculiar structures.

100. COKE, iridescent.

101. COKE from gas retorts.

Gas Works, Leith.

102. COKE from gas retorts, a good conductor of electricity.

103. COKE, from gas retorts, same as No. 102, cut and polished to show its compact structure, and deposition in regular layers.

Nos. 100 to 103 presented by Dr. J. Percy, F.R.S.

104. CARBON CYLINDER, made from gas coke, and employed as the negative or conducting plate in Bunsen's battery.

105. CARBON POINTS, made from gas coke, and employed as the electrodes of the voltaic battery in producing the "electric light."

106. HATCHETTINE, or Mineral Tallow, in the cracks of part of a nodule of clay iron ore.

Merthyr Tydfil, Glamorganshire.

Presented by Mr. Conybeare.

107 to 109. OZOKERITE, or Mineral Wax.

Moldavia.

Employed by the peasants for greasing cart-axles, for candles, &c.

(The large specimen, No. 109, is placed in the case below.)

110. BITUMEN.

Binnie Quarry, Linlithgowshire.

Presented by the late Dr. George Wilson.

111. OZOKERITE, black, a variety closely resembling Bitumen.

Occuring in the sandstone of the coal measures, near Edinburgh.

112. SANDSTONE, in which the Ozokerite (No. 111) is found.

113. CANDLE, made from the Ozokerite, and used in the collieries where it occurs.

Nos. 111 to 113 presented by J. H. Vivian, M.P.

114. BITUMEN, or Mineral Pitch, on grit.

Prestongrange Colliery, Tranent, Haddingtonshire.

115. Bottle of LIQUID BITUMEN.

Found in a cross cut in the Prestongrange Colliery, Tranent.

Nos. 114 and 115 presented by Sir G. Grant Suttie, Bart.

116. ASPHALT, or compact Bitumen.

From the Great Pitch Lake, Trinidad.

117. WIRE for electric telegraph purposes, coated by a patent process with asphalt,

From the Great Pitch Lake, Trinidad.

Nos. 116 and 117 presented by the late Earl of Dundonald.

118. ASPHALT, with Calcite.

Castleton, Derbyshire.

119. Asphalt, in stalactites.
Blue John Mine, Castleton, Derbyshire.

120. Asphalt.
Occurring in the Cambrian Schists of Haughmond Hill, near Shrewsbury, Salop.

121. Bituminous Limestone, known as "Seyssel Rock Asphalt."
Seyssel, Dept. of the Ain, France.
Presented by H. Bauerman, F.G.S.

122. Elaterite, Elastic Bitumen, or Mineral Caoutchouc.
Castleton, Derbyshire.

123. Retinite, or Retinasphaltum.
Occurring with the Lignite of Bovey Tracey, Devonshire.

124. Resinous Substance.
Occurring in the Lignite (No. 82) *of Tasmania.*
Presented by Sir W. Denison.

125. Resin, showing its mode of occurrence in the coal at *Labuan.*

126. Resin.
From the coal, Labuan.
Nos. 125 and 126 presented by Jas. Motley.

127. Vegetable Gum.
From the upper Greensand, Black Gang Chine, I. of Wight.
Collected and presented by Sir H. T. De la Beche, September 1852.

128. Copaline, or Highgate Resin.
Highgate.

129. Mellite, or Honey Stone (*Hydrous Mellate of Alumina*).
Artern, Thuringia.

130. Amber, or Succinite.
From the Prussian shores of the Baltic Sea.

131. Amber, of pale colour.

132. Amber, in lignite.
Sandy Point, Magellan Strait.

133. String of Amber Beads, of Chinese manufacture.

133a. Gum Animé, often mistaken for Amber. The name is derived from the fact of the gum generally enclosing insects, as seen in this specimen.
Bengal.

Case C.

Sulphur.

As will be observed from some of the specimens,—sulphur is frequently found in a state of great purity, although not in sufficient quantity to admit of its being commercially employed without preparation. It is an element which having been naturally combined with certain metals is also obtainable from such compounds, and thus the sulphide of iron, commonly known as Pyrites, is employed to the amount of hundreds of thousands of tons for making sulphuric acid.

134 to 143. Varieties of Native Sulphur.
From Czarcow, near Cracow, Poland.

144. Native Sulphur, massive.
Presented by S. Highley, jun.

145. Native Sulphur, mingled with clay, &c.
Radoboj, Croatia.

146. Native Sulphur, on decomposed trachyte.
Solfatara, near Naples.

147. Native Sulphur, earthy.
Solfatara, near Naples.

148. Native Sulphur, on gypsum.
La Cattolica, near Girgenti, Sicily.

149. Native Sulphur, crystallized.
La Cattolica, Sicily.

150. Native Sulphur, massive.
Girgenti, Sicily.

151. Native Sulphur, crystallized.
Girgenti.
Presented by Signor Giacinto Berruti.

152. Native Sulphur, detached crystal.
Girgenti.

153. Native Sulphur, crystallized, with Celestine.
Girgenti.
Presented by Mrs. Smyth.

154. Native Sulphur, crystallized, with Celestine, or Sulphate of Strontia.
Girgenti.

155. Native Sulphur, in crystals, coating a wall of calc spar, and also disseminated through the matrix.
Conilla, near Cadiz, Spain.
Presented by S. Highley, jun.

156. Native Sulphur.
From the neighbourhood of Krabbla, Iceland.

157. Native Sulphur, stalactitic.
Krabbla, Iceland.

158. Native Sulphur.
Brennisteinsfjöll, or Sulphur Mountain, Iceland.

159. Native Sulphur.
Krusivik, Iceland.
Nos. 158 and 159 presented by J. W. Bushby.

160. Native Sulphur.
Formosa.
Presented by Robert Swinhoe.

161. Native Sulphur.
From the hot springs, 30 miles S. of Carúpano, Venezuela.
Presented by G. P. Wall.

162. Tablet supporting Models of the more common crystalline forms of Sulphur.

163 to 168. A series of Minerals from which Sulphur is or may be obtained, followed by 168 to 190, illustrating the varieties of sulphur artificially produced.
Presented by S. Highley, jun.

163. Nodular Iron Pyrites (*Bisulphide of Iron*).

164. Radiated Iron Pyrites.

165. Marcasite, or Rhombic Iron Pyrites.

166. Cockscomb Pyrites, variety of Marcasite.

167. Iron Pyrites, in cubic crystals.

168. Copper Pyrites (*Sulphide of Iron and Copper*).

169. Crude Sulphur of commerce.

170. Crude Sulphur, prepared from Sicilian native sulphur.

171. Crude Sulphur, in drops, from the distillation of Sulphides of iron and copper.

172. Lump Sulphur.

173. Roll Sulphur.

174. Cake Sulphur.

175. Moulded Sulphur.

176 and 177. Roll and Cake Sulphur.
(Placed in the case beneath.)

178. Sulphur Sublimatum, or Flowers of Sulphur.

179. Sulphur Præcipitatum, or Milk of Sulphur, pure.

180. Sulphur Præcipitatum, adulterated with Plaster of Paris.

181. Small crucible with the amount of Plaster of Paris contained in the crucible full of Milk of Sulphur.

182. Sulphur Vivum.

183. Sulphur, crystallized by fusion in a crucible.

184. Sulphur, in detached oblique rhombic prisms obtained by fusion.

185. Sulphur, in acicular crystals.

186 to 188. Sulphur, in rhombic forms, crystallized from Camphine at temperatures from 170·6° to 280·4° Fah.

189. Sulphur, in rhombic forms, crystallized from solution in Bisulphide of Carbon.

190. Tablet supporting specimens of Rhombic Sulphur artificially crystallized.

1. From Sulpho-pentachloride of Phosphorus at 244·4° Fah.
2. From Camphine at 224° Fah.
3. From Bisulphide of Carbon at 62° Fah.

191. Model showing the crystallographic axes of the rhombic forms assumed by Native Sulphur, and Sulphur which has been artificially crystallized by evaporation.

192. Model showing the crystallographic axes of the oblique or monoclinic forms assumed by Sulphur which has been crystallized from fusion.

Nos. 162 to 192 presented, from the Great Exhibition, 1851, by Samuel Highley, jun.

193. Crude or Unrefined Sulphur.

Ireland.

Presented by M. E. Duclose de Boussirs.

194. Cake Sulphur, prepared from the impure stone, or ore (No. 145), of *Radoboj, Croatia.*

195. Crude Sulphur, prepared from the stone of *Szwoszowicze, Gallicia.*

196. Cake Sulphur, prepared from the ore of *Szwoszowicze, Gallicia.*

Nos. 195 and 196 presented by the Austrian Government.

197. Tablet supporting five Sulphur Casts of Gems. The vermilion exterior is obtained by pouring the fused sulphur into moulds coated with vermilion.

198. Tablet with two Sulphur Casts of a Greek Coin, with inscription,
ΒΑΣΙΛΕΩΣ ΑΝΤΙΟΧΟΥ ΕΥΕΡΓΕΤΟΥ.

Selenium.

199. Seleniferous Deposit.

From the roasting furnaces of the Mansfeld Copper-Slate Mining Company, at Eisleben, Prussian Saxony.

200. Selenium, prepared from the Seleniferous Deposit (No. 199) by the Mansfeld Copper-Slate Mining Company, Eisleben.

From the International Exhibition, 1862.

Case D.

Salts of Soda, Potash, &c.

Along with the more notable natural salts which possess a metallic base of sodium, potassium, aluminium, or magnesium, there is ranged a small series of boracic acid and its salts, although the base of these, boron, is commonly classed as a parallel to carbon, from certain resemblances observable in the pure element when artificially obtained.

201. Crystallized Sodium, prepared at the Washington Aluminium Works, Newcastle-on-Tyne.

Presented by J. Lowthian Bell.

202 to 205. Rock Salt (*Chloride of Sodium*).

From the New Red or Keuper Marls, Northwich, Valley of the Weaver, Cheshire.

Presented by Sir Philip Egerton, Bart.

(Nos. 204 and 205 are placed in the case beneath.)

206. Rock Salt, crystalline and colourless.

Cheshire.

207. Rock Salt, red variety.
Cheshire.

208. Rock Salt.
From a boring 1,300 *feet deep, New Red Marls, Middlesbro'-on-Tees.*
The salt upwards of 100 feet thick, newly discovered, 1863.
Presented by H. Bauerman, F.G.S.

209 and 210. Rock Salt, in marl.
Poland.

211. Rock Salt.
From the Tertiary Marls of San Leopoldo, Volterra, Tuscany.

212. Rock Salt, purple.
Volterra, Tuscany.

213. Rock Salt, blue.
Hallstadt, Austria.

214. Rock Salt, in contorted fibres.
Arabia Petræa.
Presented by Major Macdonald.

215. Rock Salt, in cubic crystals.

216 and 217. Bay Salt, in hopper-shaped crystals from the evaporating pans.

218. Cryolite, or Ice-stone (*Fluoride of Sodium and Aluminium*).
Asksut-fiord, Greenland.
Presented by Augustus Robinson.

219. Cryolite, with Spathose Iron Ore, &c.
Arksut-fiord, Greenland.

220. Thenardite (*Anhydrous Sulphate of Soda*).
Old Castile, Spain.

221. Glauberite (*Sulphate of Soda and Lime*).
Andossila, Navarre, Spain.

222. Nitratine, or Cubic Nitre (*Nitrate of Soda*), a natural stalactite.
Tarapaca, Peru.
Presented by William Bollaert.

223. Borax, or Tincal (*Hydrous Bi-borate of Soda*).
Thibet.

224. Two detached crystals of native Borax.
Thibet.
Collected and presented by Captain Strachey.

225. Hayesine, or "Tiza" (*Hydrous Borate of Lime and Soda*), as imported into Liverpool.
From Peru.
Presented by T. C. Archer.

Nos. 226 to 240. A series of specimens illustrating the production of Boracic Acid at the works of the late Count Larderel, in the *Maremme, Tuscany.*
Presented by the late Count Larderel.

226. Dolomitic Limestone, of *Monte Rotondo*, near the Boracic Acid Lagoons.

227. Gypsum.
From the Boracic Acid Lagoons, Monte Cerboli.

228. Various Crystallized Substances produced at the Boracic Acid Works.

229. Calcareous Incrustation, from the evaporating caldrons.

230. Impure Insoluble Deposit, from the concentrated waters of the Boracic Acid Lagoons.

231. Residuum of the Lagoons.

232. Boracic Acid, or Sassolin.
San Francisco.

233. Boracic Acid, good quality.
San Francisco.

234. Boracic Acid, inferior quality.
Sant Adriano.

235. Boracic Acid.
San Filiberto.

236. Boracic Acid.
Sant Angiolo.

237. Boracic Acid.
San Giacomo.

238. Boracic Acid.
Sant Enrico.

239. Boracic Acid.
Sant Edouard.

240. Larderellite (*Hydrous Borate of Ammonia*).
Monte Rotondo, Tuscany.

241. Nitre, or Saltpetre (*Nitrate of Potash*).
Lower Egypt.

242. Saltpetre, rough.
Bengal.

243 and 244. Saltpetre, refined and crystallized.
Bengal.
Nos. 242 to 244 presented by Messrs. Richardson, Brothers.

245. Native Alum (*Hydrous Sulphate of Potash and Alumina*).
From shaly beds under Carboniferous Limestone along the flanks of the Western Mountains, Tasmania.
Presented by Dr. J. Milligan.

246. Alum, artificially crystallized.

247. Alum, fine group of artificial crystals.
(Placed in the case beneath.)

248. Alum, cube cut out of a crystalline mass.
Nos. 246 to 248 presented by John Lee.

249. Alum Shale, employed for the manufacture of Alum.
Whitby, Yorkshire.

250. Alum Shale, decomposing and showing efflorescence of Alum.
Whitby.

251. Green Vitriol (*Hydrous Sulphate of Iron*), in crystals, produced by the decomposition of the alum shale.
Whitby.

252 to 255. Alunite, or Alum Stone (*Hydrous Sulphate of Alumina and Potash*), a substance occurring in large rock masses.
Muzay, Hungary.

256. Native Sal Ammoniac (*Chloride of Ammonium*).
From the eruption of Vesuvius, Feb. 1850.

257 and 258. Brucite (*Hydrate of Magnesia*).
Wood's Mine, Chester Co., Pennsylvania.

259. Epsomite, or Native Epsom Salt (*Hydrous Sulphate of Magnesia*).
Western Mountains, Tasmania.
Presented by Dr. J. Milligan.

260. Kieserite (*a Hydrous Sulphate of Magnesia*).
From the Salt Works, Stassfurth, near Magdeburg, Prussian Saxony.

261. Stassfurthite, a variety of Boracite (*Borate of Magnesia and Chloride of Magnesium*).
Stassfurth, near Magdeburg.

262. Carnallite (*Chloride of Magnesium and Potassium*).
Nos. 260 to 262 presented, from the International Exhibition, 1862, by the Zollverein Commissioners.

263. Struvite (*Hydrous Phosphate of Magnesia and Ammonia*).
Found in 1845, when digging the foundation of the new church of St. Nicholas, at *Hamburg.*

Case E.

Baryta and Strontia.

The earthy oxides of Barium and Strontium are seldom met with except in combination with carbonic and sulphuric acids, forming the carbonates and sulphates of Baryta and Strontia. They are minerals which strongly resemble one another in most of their physical characters; but whilst those of Strontia are comparatively rare, those of Baryta are found in numerous localities, and the sulphate (Barytes) is one of the commonest associates of lead ore in Derbyshire, Saxony, &c. Their applications in the arts are various; Barytes is largely used as a paint,

Witherite in the refining of sugar ; and the Strontia minerals for the production of a splendid crimson tint in fireworks.

264. BARYTES, or Heavy Spar (*Sulphate of Baryta*).
Wotherton, near Montgomery.

265. BARYTES, crystallized.

266. BARYTES, in tabular crystals.
Dufton, Westmorland.

267. BARYTES, portion of a large colourless crystal.
Dufton.

268. BARYTES, the largest crystal of this substance recorded, weighing 100 lbs.
Dufton, Westmorland.
Presented, from the Great Exhibition, 1851, by John Cowper, jun., of Aldstone.
(This large specimen is placed in the case beneath.)

269. BARYTES, crystallized.
Aldstone.

270. BARYTES, in opaque white crystals, with sphenoids of Copper Pyrites, scattered over the surface.

271. BARYTES, in chisel-shaped crystals.
Aldstone Moor, Cumberland.

272. BARYTES, successive deposition of different varieties of, in the cracks of contraction of a nodule of clay-ironstone.
From the lower measures, Clifton, Workington, Cumberland.
Presented by W. W. Smyth, F.R.S.

273. BARYTES, in opaque white crystals.
Bowes, Yorkshire.

274. BARYTES, brick red, massive.
Snailbeach Lead Mine, Shropshire.

275. BARYTES, coloured black by oxide of manganese.
Youlgrave, Derbyshire.

276 to 279. BARYTES, polished specimens of a stalactitic brown variety.
From a cavern in the limestone at Arbelows, Derbyshire.
(The large specimen, No. 279, is placed in the case beneath.)

280. BARYTES, massive variety termed "Cawk," employed for the adulteration of white-lead, and for other purposes.
Buxton, Derbyshire.
(Placed in the case beneath.)

Nos. 281 to 283. BARYTES, as prepared for application in the arts.
Matlock, Derbyshire.

281. BARYTES, pounded ready for grinding.

282. BARYTES, after grinding in the mill.

283. BARYTES, whitened by boiling with hydrochloric acid, and now ready for use as a paint.

284. BARYTES, yellow variety, with Quartz.
From the fullers' earth pits, Lower Greensand, Nutfield, near Reigate, Surrey.
Presented by P. Gosse.

285. BARYTES, in limpid crystals.
From the Lead Lode of Menheniot Mine, E. Cornwall.

286. BARYTES, crystallized.
Occurring in the Copper Lode of United Mines, Gwennap, Cornwall.

287. BARYTES, opaque white variety.
Ireland.
Presented by the late John Taylor.

288. BARYTES, opaque white, crystalline.
Derry-ginah, Ireland.
Presented by S. Weston.

289. BARYTES, finely crystallized.
Buckingham Mine, Buckingham Co., Virginia, U.S.
Presented by John Baker.

290. WITHERITE (*Carbonate of Baryta*).
Fallowfield mine, near Hexham Northumberland.

291. Witherite, crystallized.
Aldstone Moor.
Presented by the late J. Taylor.

292. Witherite, crystallized.
Aldstone Moor.

293. Witherite.
Aldstone Moor.
(Placed in the case beneath.)

294. Witherite, radiated.
Occurring in the Lead Vein at Snailbeach, Shropshire.

295. Alstonite (*Carbonate of Baryta and Lime*, rhombic species).
Aldstone Moor.

296. Barytocalcite (*Carbonate of Baryta and Lime*, oblique species).
Aldstone Moor.

297. Celestine (*Sulphate of Strontia*), in crystals with native Sulphur.
Girgenti, Sicily.

298 and 299. Celestine, with native Sulphur.
Sicily.
Presented by Richard Stephens.

300. Celestine.
From the New Red Marls of Bristol.
(Placed in the case beneath.)

301. Celestine.
From the New Red Marls, Bristol.
Presented by H. Bright.

302. Celestine, in fine tabular crystals.
Bristol.
Presented by H. Bright.

303. Celestine, in tabular crystals.
Occurring in nodules in the New Red Marls, Bristol.

304. Celestine, crystallized, with Selenite, or Sulphate of Lime.
Bristol.

305 and 306. Celestine, in fine prismatic crystals.
From the Exeter and Bristol Railway cutting, Pyle Hill, Bristol.

307. Celestine, crystallized in the chambers of an Ammonite.
From the Lias of Adderley, Shropshire.
Presented by Richard Corbet.

308. Celestine, crystallized on Flint.
Near Paris.

309 to 311. Strontianite (*Carbonate of Strontia*), radiated.
Strontian, Argyleshire.
Presented by Sir James Miles Riddell, Bart.

312. Strontianite, green, radiated.
Strontian.

313. Strontianite, green, crystallized.
Strontian.
Presented by Sir J. M. Riddell, Bart.

Case F.

Salts of Lime: Gypsum, Anhydrite, Apatite.

The minerals in which Lime is combined with certain acids or with elementary substances, forming salts or haloids (salt-like bodies), constitute a series of great extent; and they are no less noticeable for their variety, than for the large scale on which some of them are found in nature, and for the numerous purposes to which they are applied. Those in the present case are sometimes worked into ornamental objects, but receive their widest application in the manufacture of mineral manures.

314 to 320. Selenite, or crystallized Gypsum (*Hydrous Sulphate of Lime*).
From the Duke Ernest's Mine, near the Castle of Reinhardtsbrunn, Germany.
Presented by H R.H. Prince Albert.

321. Selenite, contorted crystal.
Germany.
Presented by Sir J. Clark, Bart.

322. Selenite, from the Gault.
Folkestone, Kent.
Presented by Capt. Vetch, R.E.

323. SELENITE, fine crystal.
Shotover Hill, Oxfordshire.
Presented by J. Tennant, F.G.S.

324. SELENITE, two crystals.
Shotover Hill.
Presented by Mr. Monteiro.

325. SELENITE, large arrow-head crystal.
Montmartre, Paris.

326. SELENITE, with Celestine, or Sulphate of Strontia.
Bristol.
Presented by P. J. Worsley.

327. SELENITE, enclosing a cavity containing liquid and a minute air bubble.
Bex.

328. SELENITE.
Berchtesgaden, Bavaria.

329. SELENITE, crystallized from solution in hydrochloric acid.

330 to 332. SELENITE, crystals containing sand.
Sussex Vale, New Brunswick.
Presented by O. C. Marsh.

333. SELENITE, with sand, and forming casts of fossil shells (Cardium Laytoni, and a Cyrena).
From the basement bed of the London Clay, Upnor, near Rochester, Kent.
Contributed by the Geological Survey.

334. FIBROUS GYPSUM, or Satin Spar.
Nottinghamshire.

335. FIBROUS GYPSUM.
From the lower bed of Greensand, Atherfield Cliff, Isle of Wight.

336. FIBROUS GYPSUM.
East Bridgeford, near Nottingham.

337. FIBROUS GYPSUM, worked into a Cross.

338. String of Beads, manufactured at Derby, from the FIBROUS GYPSUM of *Newark, Nottingham.*

339. FIBROUS GYPSUM, crystallized in contortions.

340 and 341. GYPSUM, massive.
From the New Red Marls, Cardiff, Glamorganshire.
Presented by the late Sir H. T. De la Beche.
(No. 341 is placed in the case beneath.)

342. GYPSUM, occurring with Sulphides of Lead, Zinc, and Copper, and Carbonate of Iron,
In the great Lode, Spitaler Gang, Schemnitz, Hungary.

343. GYPSUM.
From the Lagoons of Monte Cerboli, Tuscany.
Presented by the late Count Larderel.

344. GYPSUM.
Deposited in a boiler at the Tamar Mines, Devon.
Presented by W. W. Smyth, F.R.S.

345. ALABASTER, a fine granular-crystalline variety of Gypsum.
From the New Red Marls, near Watchet, Somersetshire.

346. ALABASTER, dark coloured variety.
Near Watchet, Somersetshire.
Nos. 345 and 346 presented by Sir W. C. Trevelyan, Bart.

347. CARVING in ALABASTER, by Mr. Jordan's patent machinery.
Subject, a brace of partridges.

348 and 349. Glass Mould, and Cast in PLASTER OF PARIS, or calcined Gypsum.
N.B.—An apparatus for exhibiting the colours developed by the transmission of polarized light through thin plates of Selenite, or crystallized sulphate of lime, is placed in the eastern embayment, at the southern end of this floor, near the case of Venetian glass; and a series fully illustrating the applications of Gypsum, will be found in Case X., on the eastern side of the hall.

350. ANHYDRITE, or Karstenite (*Anhydrous Sulphate of Lime*).
Nottingham.

351. ANHYDRITE, foliated-granular.
Switzerland.

352. ANHYDRITE.
Ariége, Pyrénées.

353. APATITE (*Phosphate of Lime*).
Hammond, New York.

354. APATITE, detached crystal.
Rossie, St. Lawrence Co., New York.

355. Apatite, large green crystals, with Mica, imbedded in pink Carbonate of Lime.
Canada.
Presented by Sir W. E. Logan.
(Placed in the case beneath.)

356. Apatite, massive. This variety has been largely worked and imported by ship loads into England.
Kragerö, Norway.
Presented by the late Brooke Evans.

357. Apatite, crystallized, with Hornblende.
Snarum, Norway.

358. Apatite, detached doubly-terminated crystal.
Snarum, Norway.

359 & 360. Apatite, massive variety called Phosphorite.
Estremadura, Spain.
Presented by Dr. Daubeny, 1844.

361. Apatite.
From the Tin Mines of Ehrenfriedersdorf, Saxony.

362. Apatite.
Schlaggenwald, Bohemia.

363. Apatite, crystallized, with Felspar, Tourmaline, and Quartz.
Devonshire.

364. Apatite, variety called Francolite.
Fowey Consols, St. Blazey, Cornwall.

365. Guano, employed for the manufacture of manure.
From the Aves Islands, on the coast of Venezuela.

Phosphate of Lime and Magnesia	80
Carbonate of Lime - -	9
Water - - - -	11
	100

Presented by George Sumner.

366. Coprolites, organic remains consisting chiefly of Phosphate of Lime, and extensively used for agricultural purposes.
Newmarket Road, Cambridge.

367. Coprolites.
Baudsey, Suffolk.

368 & 369. Coprolites, mammalian, fish, and other animal remains rounded by attrition.
From the Mammaliferous Crag of Suffolk.
Presented by Mrs. R. D. Alexander.

370. Coprolites.
From the Greensand, near Harwich, Essex.

370a. Coprolites, sample of No. 370 pulverised.
No. 370 and 370a presented by E. Pusser.

371. Coprolites.
Wallet Shore, off Essex.

372. Coprolites.
West Cliff, Folkestone.

373. Tooth of a Horse, in which the phosphate of lime has been replaced by Vivianite, or phosphate of iron.
Found in a small stream at Bodewryd, near Amlwch, Anglesey.
Presented by Lord Stanley of Alderley.

374. Guards of Belemnites, in which the phosphate of lime has been replaced by Mullicite, or Vivianite.
Mullica Hill, New Jersey, U.S.
Presented by Dr. R. H. Lamborn.

375. Pharmacolite (*Hydrous Arseniate of Lime*).
Wittichen, Baden.

Case G.

Fluor Spar.

This beautiful mineral occurs as an accompaniment of ores of tin, copper, and lead, serving the useful purpose when so commingled of imparting easy fusibility. Our northern British districts of lead mines are the most remarkable in the world for the beauty of the crystallized

Fluors. In Derbyshire it occurs in masses solid enough to admit of being wrought into vases. The eastern portion of Cornwall, up to the border river, the Tamar, is also noticeable for the colours, and the size, and numerous planes of the crystals.

376. FLUOR SPAR, (*Fluoride of Calcium*), in large cubic crystals, partially encrusted with Carbonate of Iron.
From the hollow parts of the lead-bearing veins of Allenheads, Northumberland.
Presented by W. B. Beaumont, M.P.

377. FLUOR SPAR, in green cubic crystals.
Near Darlington, Weardale, Durham.

378. FLUOR SPAR, in blue cubic crystals.
Weardale, Durham.

379. FLUOR SPAR, with Quartz, on Spathose Iron Ore.
Co. of Durham.

380. FLUOR SPAR, in purple crystals, with Quartz and Calcite.
Durham.

381. FLUOR SPAR, in yellow crystals, with Calcite.
Co. of Durham.

382 & 382a. FLUOR SPAR, in green cubic crystals, on disintegrating limestone.
Co. of Durham.
(No. 382a is placed in the case underneath.)

383. FLUOR SPAR, in purple cubic crystals.
Cargill, Aldstone Moor, Cumberland.

384. FLUOR SPAR, in cubic crystals, partially encrusted with Bitter Spar.
Aldstone.

385. FLUOR SPAR, purple, from a vein of galena and blende.
Smittergill Head Mine, Cumberland.

386. FLUOR SPAR, with minute disseminated crystals of Copper Pyrites.
Cockwell Mine, Ashover, Derbyshire.

387. FLUOR SPAR, massive purple variety, locally termed "Blue John."
Derbyshire.

388. FLUOR SPAR, a mass exhibiting on one side the thickness of the crystalline deposit.
Castleton, Derbyshire.

389. FLUOR SPAR, a crystalline mass roughly rounded previously to turning in a lathe.
Castleton, Derbyshire.

390. FLUOR SPAR, worked into a TAZZA.
(Nos. 387 to 390 are placed in the case beneath.)

391. TAZZA, of dark purple Derbyshire FLUOR SPAR.
(In the hall will be found two vases of purple Derbyshire Fluor Spar, one of which is said to be the largest and finest known specimen.)

392. Circular DISH of yellow DERBYSHIRE FLUOR SPAR.

393 to 405. Polished sections of DERBYSHIRE FLUOR SPAR, the colour being developed by exposure to heat.

406. FLUOR SPAR, locally termed "Cann," pale green variety.
South Tamar Lead Mines, Devonshire.

407. FLUOR SPAR, pale green cubic crystals, partially incrusted with crystallized Quartz.
South Tamar Lead Mines, Devonshire.

408. FLUOR SPAR, in white cubes, with rhombohedral crystals of Dolomite.
From a Lead Mine, near Beeralston, Devonshire.

409. FLUOR SPAR, blue, with Iron Pyrites, resting on Quartz crystals, which invest earlier formed cubes of Fluor.
From the Lead Mines of Beeralston, Devonshire.

410. Fluor Spar, in green octohedral crystals built up of minute cubes.
Devonshire.

411. Fluor Spar, in large blue cubes, having the solid angles replaced by planes of the hexakis-octohedron, with Iron Pyrites.
Menheniot Mines, Cornwall.

412. Fluor Spar, crystallized in combination of cube and hexakis-octohedron, exhibiting internal parallel planes of deposition ; with Galena.
Menheniot Mines, Cornwall.

413 & 414. Fluor Spar, crystallized in combination of tetrakis-hexahedron and rhombic dodecahedron.
St. Agnes, Cornwall.

415. Fluor Spar, colourless.
From the Lead lode, at the 130 *fathoms level, Holmbush Mine, near Callington, Cornwall.*

416. Fluor Spar, massive uncleavable variety, highly phosphorescent on exposure to heat.
East Pool Mine, near Redruth, Cornwall.
Presented by the late John Garby.

417. Fluor Spar, octohedral crystals converted into hornstone.
Huel Mary Ann, Cornwall.

418. Tablet supporting specimens of cleaved Fluor Spar.
1 to 3. Regular Octohedrons.
4. Regular Tetrahedron.
5. Acute Rhombohedron.

419. Fluor Spar, green, crystallized in combination of cube and octohedron.
Stolberg, Hartz.

420. Fluor Spar, green, in cubo-octohedral crystals, with Copper Pyrites.
Rottleberode, Hartz.

421. Prosopite, a steatitic pseudomorph after a paramorphic variety of purple Fluor Spar ; with Hæmatite, and Fluor.
From the Tin Mines of Altenberg Saxony.
Presented by H. Bauerman, F.G.S.

Case H.

Two cases are devoted to the carbonate of Lime, it being impossible within a smaller compass to give a fair representation of the manifold appearances of that compound. Besides the many hundred different forms of crystal in which Calcite, or the hexagonal carbonate, is found, there is a long series of figures assumed by Aragonite, the rhombic carbonate, and both species appear in a great variety of conditions, crystalline, stalactitic, or compact, and more or less tinted and variegated by colouring substances. Hence the interminable wealth of pattern and colour which nature presents to us in the marbles. A single country may thus require a large suite of specimens for its full illustration, more particularly if the object of the collection be purely artistic. A large number of examples of our Derbyshire and Devonshire marbles are exhibited in the lower hall, and a far more extensive series would have to be shown were it the object of the Museum to illustrate the marbles of either the Pyrenees, Italy, or Spain.

Calcite.

422. Calcite, or Calcareous Spar (*Carbonate of Lime*).
Strontian, Argyleshire.

423. Calcite, with annular Iron Pyrites enclosing radiated Barytes.
Strontian.

424. Calcite, crystallized in the hexagonal prism penetrated by a rhombohedron, the solid angle of which partly protrudes from the terminal plane of the prism.
Strontian.

425. CALCITE, crystallized in combination of acute and obtuse scalenohedrons.
Strontian.

426. CALCITE, crystallized, on Galena.
Strontian.
Nos. 422 to 426 presented by Sir J. M. Riddell, Bart.

427. CALCITE, crystallized in combination of obtuse rhombohedron and prism, with Quartz.
Aldstone Moor, Cumberland.

428 & 429. CALCITE, in combination of obtuse rhombohedron and prism, on Fluor Spar.
Aldstone Moor.

430. CALCITE, in combination of prism and terminal rhombohedron, called "Nail-head Spar."
Aldstone Moor.

431 & 432. CALCITE, in combination of obtuse rhombohedron and prism.
Aldstone Moor.

433. CALCITE, in combination of obtuse rhombohedron and prism.
Aldstone Moor.

434. CALCITE, in combination of prism and scalenohedrons.
Aldstone Moor.

435. CALCITE, in combination of very acute and obtuse rhombohedrons.
Aldstone Moor.

436. CALCITE, crystallized on Fluor Spar.
Aldstone Moor.

437. CALCITE, with Fluor.
Aldstone.

438. CALCITE, in opaque white crystals.
Drygill, Cumberland.
Presented by the late H. L. Pattinson.

439. CALCITE, crystallized in scalenohedron terminated by rhombohedron.
Patterdale, Cumberland.

440. CALCITE, crystallized in hexagonal prism with terminal plane, on Galena.
Helvellyn, Cumberland.

441. CALCITE, crystallized in the form of the primary rhombohedron, with rudimentary planes of the scalenohedron.
Snailbeach Lead Mines, Shropshire.
Presented by W. W. Smyth, F.R.S.

442. CALCITE, a large scalenohedral crystal.
Derbyshire.

443. CALCITE, a large scalenohedron exhibiting unequal development of faces.
Derbyshire.

444. CALCITE, crystallized in large scalenohedrons.
Derbyshire.

445. CALCITE, simultaneously crystallized with Galena.
Matlock Bath, Derbyshire.

446. CALCITE, in scalenohedral twins, or hemitropes, known as "Dog-tooth Spar."
Derbyshire.

447. CALCITE, in scalenohedral crystals.
Derbyshire.

448. CALCITE, crystallized in lengthened rhombohedrons, on black Limestone.
Near Totness, Devonshire.

449. CALCITE, in rhombohedral crystals, on Quartz, with lenticular crystals of Carbonate of Iron covered with Iron Pyrites.
Tamar Mines, Devon.

450. CALCITE, in hexagonal tabular crystals.
Huel Friendship Copper Mine, Devon.

451 & 452. CALCITE, in lenticular crystals.
Lead Lode, Tavistock, Devon.

453. CALCITE, with Quartz, and Iron Pyrites.
Liskeard, Cornwall.

454 & 455. CALCITE, crystallized in combination of prism, rhombohedron, and terminal plane.
From the lead lode of Huel Wrey, near Liskeard.

456. Calcite, in prism, terminated by rhombohedron, the crystals being "capped."
Huel Wrey.

457. Calcite, in opaque white crystals, with Quartz, and Iron Pyrites.
Herodsfoot Mine, near Liskeard.

458. Calcite, in large transparent rhombohedrons.
Milltown Lead Mine, Co. Clare, Ireland.
Presented by W. W. Smyth, F.R.S.
(Placed in the case beneath).

459. Calcite.
Andreasberg, Hartz.

460. Calcite.
Traversella, Piedmont.

461. Iceland Spar, transparent rhombohedral Calcite, exhibiting double refraction.
Iceland.

462. Iceland Spar, or Doubly-refracting Spar.
Iceland.
Presented by His Grace the Duke of Devonshire, K.G., &c.

463. Hislopite, rhombohedral Calcite, coloured green by hydrous silicate of iron, or Glauconite.
Western India.
Presented by Dr. Carter.

Case I.

Carbonate of Lime, &c.

464. Stalagmitic Carbonate of Lime.
From the iron mines of Mitchel Dean, Gloucestershire.

465. Stalagmitic Carbonate of Lime, a polished section.
Suisan Bay, California.
Presented by E. Seyd.

466. Onyx Marble, a stalagmitic Carbonate of Lime, rough specimen.
Near Tafna, Algeria.
Presented by James Caird, M.P.

467 and 468. Onyx Marble, polished slabs.
Algeria.
From the Paris Exhibition, 1855.

469. Onyx Marble, worked into an oval Dish. Said to be from the same quarries which formerly supplied Rome and Carthage.
Oued Abdallah, Oran, Algeria.
From the International Exhibition, 1862.
(Placed in the case beneath.)

470. Schiefer Spar, a lamellar or slaty variety of Carbonate of Lime, occurring in a lead lode in Granite.
Seven Churches, Co. Wicklow.

471. Pisolite, or Peastone, a concretionary Carbonate of Lime,
Deposited from the springs of Carlsbad, Bohemia.

472. Snuff Box, formed of "Eyestone," a calcareous deposit
From the Roman States.

473 and 474. Fontainebleau Sandstone, Carbonate of Lime cementing grains of Sand into rhombohedral forms.
Forest of Fontainebleau.

475. Carrara Marble.

476 to 478. Varieties of Marble.

(Nos. 475 to 478 placed in the cases beneath.)

479. Landscape Marble, an argillaceous limestone exhibiting dendritic markings.
From the Lower Lias, Cotham, near Bristol.

480 and 481. Fire Marble, or Lumachella,
From the Lead Mines of Bleiberg, Carinthia.

482. Casket of Fire Marble.

483 and 484. Giallo Antico, or Yellow Marble of Sienna.
Tuscany.

485 to 489. Varieties of Marble.

Derbyshire.

(A large collection of British marbles is displayed in the hall.)

490. Ewer and Stand, of Rosewood Marble.

Ashford, near Bakewell, Derbyshire.

491. Black Marble Cup on stem.

Ashford, near Bakewell, Derbyshire.

492. Sienna Marble Cup on stem, with octagonal base of Black Marble.

(Nos. 490 to 492 placed in the case beneath.)

493. Inlaid Marble Slab, copied from the Florentine "pietra dura."

Manufactured by Thomas Woodruff, Bakewell, and presented by Francis Barker.

Nos. 494 to 497. A series illustrating the Derbyshire and Florentine processes of inlaying Marble, manufactured by Samuel Birley, Ashford; and presented, from the International Exhibition, 1862, by Francis Barker.

494. The Design to be inlaid.

495. Stem, Leaves, Buds, and Stigmata prepared for insertion in the spaces left unfilled in Nos. 496 and 497.

496. Marble Slab, partially inlaid, illustrating the Florentine method. Pieces of coloured marble, &c. are accurately fitted into corresponding apertures cut in a thin piece of black marble, which, when so filled in, is cemented to a slab of marble or slate.

497. Marble Slab, partially inlaid, illustrating the Derbyshire method. The pieces of marble, &c. are here cemented into holes sunk to the required depth in a solid slab of marble, and the surface afterwards polished.

498. Black Marble Plate, with inlaid wreath of flowers.

498a. Large Black Marble Plate, with geometric design inlaid with coloured marbles, malachite, fluor-spar, barytes, &c.

(Nos. 498 and 498a placed in the case beneath.)

499. White Marble Tray, inlaid with floral ornament.

Manufactured at Rajpootanah, Western India.

From the Paris Exhibition, 1855.

500. Large Pearl, attached to the valve of a Pearl Oyster.

501 and 502. Valves of the Chinese Pearl Mussel, with images of Buddha, produced by the Chinese by introducing casts of the figure between the mantle and the shell of the living animal, which, irritated by the presence of these foreign bodies, gradually covers them with a nacreous deposit.

503 and 504. Aragonite, or Arragonite, a prismatic species of Carbonate of Lime.

Cleator Moor, Cumberland.

505. Aragonite, crystallized in the spar-iron "rider" of a Lead Vein.

Aldstone Moor, Cumberland.

506. Aragonite, on Calamine.

Wanlock Head, Dumfriesshire.

507. Aragonite, crystallized on Specular Iron Ore.

Cocaes Mine, Brazil.

Presented by William Reay.

508. Aragonite, crystallized on Argillaceous Gypsum.

Aragon, Spain.

509. Aragonite, crystallized in compound forms.

Herrengrund, Hungary.

510. Aragonite.

Occurring in the Chalk at Barnet Wood, near Lady Holt Park, Idsworth, Hants.

Presented by Sir J. C. Jervoise, Bart., M.P., 1864.

511. Aragonite, stalactitic.
Holwell Cavern, Broomfield, Somersetshire.
Presented by the late A. Crosse.

512. Aragonite, stalactitic.

513. Aragonite, stalagmitic.
Aldstone Moor, Cumberland.

514. Aragonite, coralloid variety called "Flos ferri," or Flower of Iron.
From the mine of Eisenerz, Styria.

515. Aragonite, or Flos ferri, fine specimen,
From the Iron Mines of Eisenerz, Styria.
Presented, from the International Exhibition, 1862, by the Austrian Commissioners.
(Placed in the case beneath.)

516. Plumbocalcite, a variety of Carbonate of Lime containing a small per-centage of Carbonate of Lead.
Leadhills, Lanarkshire.

517. Plumbocalcite.
Leadhills, Lanarkshire.
Presented by Patrick Dudgeon.

518. Plumbocalcite, crystallized.
Leadhills.

519 and 520. Dolomite, or Bitter Spar (*Carbonate of Lime and Magnesia*), in rhombohedral crystals.
Traversella, Piedmont.

521. Dolomite, in rhombohedral crystals, with Copper Pyrites.
Laxey Mines, Isle of Man.

522. Dolomite, in acute rhombohedral crystals,
From the Magnesian Limestone, near Thorner, Yorkshire.
Presented by C. Brown.

523. Dolomite, with Talc.
Greiner, Tyrol.

524. Dolomite, which has replaced scalenohedral crystals of Calcite.
St. Annal's Iron Mine, Forest of Dean.
Presented by W. W. Smyth, F.R.S. 1859.

525. Pearl Spar (variety of Dolomite containing Iron), with Fluor Spar, on Zinc Blende.
Nent Head Mines, Aldstone Moor, Cumberland.

526. Mesitine Spar (*Carbonate of Magnesia and Iron*), in lenticular crystals, with Dolomite, and Quartz.
Traversella, Piedmont.

527. Magnesite (*Carbonate of Magnesia*).
Greece.

528. Magnesite.
Turkey.

529. Magnesite.
Piedmont.

530. Magnesite.
Gulsen Mountains, Styria.
Presented, from the International Exhibition, 1862, by the Austrian Commissioners.
(Placed in the case beneath.)

Case J.

Quartz.

Quartz, the *silica* or *oxide of silicon* of the chemist, is a substance so variable in appearance, partly in consequence of difference of texture, and partly from the numerous and very marked colours given to it by a small proportion of certain natural pigments, that its different varieties have from very early periods in the history of man received special appellations. Many of these names, familiar to us both from sacred and profane history, are still retained as thoroughly convenient, notwithstanding that they were given in times when the composition also as well as the physical character of these minerals was supposed to be distinct.

531. Rock Crystal, or colourless Quartz.
Dauphiné.

532. Rock Crystal, with Albite-felspar.
Snowdon, North Wales.

533. Rock Crystal.
Snowdon.
Presented by Captain R. Roberts.

534. Rock Crystal.
Snowdon.

535. Rock Crystal, attached to Carrara marble.
Carrara, Italy.
Presented by Walter Hawkins, F.S.A.

536. Rock Crystal, enclosing Chlorite.
Alps.

537. Rock Crystal, enclosing Rutile, &c.
Dauphiné.

538. Rock Crystal, with corroded surface.
Aberdeenshire.

539. Rock Crystal, polished.
Aberdeenshire.

540. Rock Crystal, mass showing conchoidal fracture and prismatic play of colours.
Brazil.

541. Rock Crystal, or "Pebble," employed for spectacle lenses.
(Placed in the case beneath.)

542. Rock Crystal, sliced for lenses, before polishing.

543. Rock Crystal, cut concave for near sight.

544. Rock Crystal, cut convex for old sight.

545. Rock Crystal, cut into a prism.
Presented by R. Hunt, F.R.S.

546. Rock Crystal, cut as brilliants, and known to jewellers as "White stone."

547. Rock Crystal, carved into a Seal.

548. String of carved Beads of Rock Crystal.
India.

549. Rectangular block of Rock Crystal.
China.

550. Chinese Kylin carved in Rock Crystal.

551 and 552. Chinese Snuff Bottles of Rock Crystal, painted on the inside.
Nos. 549 to 552 presented by Dr. Lockhart.

553. Insect Case composed of fragments of Rock Crystal.
Cataprato, near Ciudad Imperial, Minas Geraes, Brazil.
Presented by W. W. Smyth, F.R.S.

554. Fire Stone, transparent Quartz which has been artificially treated and coloured for ornamental purposes.

555. Smoky Quartz, large pyramidal crystal, with planes of the prism.
Siberia.

556. Smoky Quartz, with specular Iron Ore.
Cleator Moor, Cumberland.

557 and 558. Smoky Quartz.
Snowdon.
Presented by Capt. R. Roberts.

559. Smoky Quartz, yellow crystal.
Cairngorm, Inverness-shire.

560 and 561. Smoky Quartz, embedded in Calcite.
Ireland.

562. Smoky Quartz, detached crystals.
Ireland.

563. Smoky Quartz, crystal containing liquid in a cavity of polygonal form.
Tintagel Slate Quarries, Cornwall.
Presented by Ashurst Majendie, F.G.S.

564 and 564a. Smoky Quartz, massive, forming Quartz rock.
Cairngorm, Inverness-shire.

565. Morion, black Quartz.

566. Cairngorm, polished slab showing crystalline structure.

567 and 568. Cairngorms, smoky tint, cut and polished.

569. Cairngorm, rich colour, cut and polished.

570. False Topaz, or Citrine, three stones cut and polished.

571. Box set with Cairngorms, Amethysts, Garnets, Aquamarines, Agates, and Pearls, the productions of
Scotland.

572. Amethyst, group of crystals.
Brazil.

573. Amethyst.
From the Copper Lode of Huel Unity, Cornwall.

574 to 576. Amethyst.
Argyleshire.

577. Amethyst, commonly called "root of amethyst."

578. Two cut Amethysts enclosing rutile.
Presented by Mr. Baker.

579 and 580. Amethysts, cut and polished.

581. Amethyst Cameo; female head.

582. Intaglio in Amethyst; Head of Hannibal.
From the Hertz Collection.

583. Rose Quartz.
Tammela, Finland.

584 to 591. Cat's Eye, cut en cabochon.
Ceylon.

592. Avanturine.
Siberia.

593. Avanturine.
Spain.

594. Avanturine, small polished slab.
Presented by J. Bragg.

595. Snuff Box of Avanturine.

596. Artificial Avanturine, manufactured at *Venice.*

597. Green Avanturine.

597a. Green Avanturine, carved.

598. Mica Schist, passing into Green Avanturine.
Bijanagur, 30 miles N.W. of Bellary, Madras.
Presented by Lieut McNair, M.A.

599. Ferruginous Quartz, or Quartz Crystals coloured by Oxide of Iron (*Eisenkiesel* of the Germans).
From the Iron Lode of the Restormel Royal Iron Mine, Lostwithiel, Cornwall.

600 and 601. Ferruginous Quartz, with Oxide of Manganese.
Restormel Royal Iron Mine, Lostwithiel.

602. Ferruginous Quartz.
Bristol.

603. Quartz Crystals coloured by Oxide of Iron.
From the Salt Mines, near Pind Dadun Khan, on the Jhilun River.
Presented by Lieut. Hart, 29th Regt.

604. Quartz in rhombohedral crystals.
Poonah District, India.

605. Quartz, crystals with trihedral terminations, exhibiting iridescence on internal faces.
Poonah District, India.

606. Quartz, in opaque white crystals, with Pearl Spar.
Aldstone, Cumberland.

607. Quartz, in opaque white pyramidal crystals.
(Placed in the case beneath.)
A large specimen of Quartz Crystals, with Fluor Spar, on Galena, presented by W. B. Beaumont, M.P., from his mines at Weardale, Cumberland, is placed on the western side of the Hall.

608 and 609. Quartz, crystals lining the two portions of a Geode.
Faroe Isles.

610. Geode, or "Potato-stone."
Bristol.

611. Geode, broken open to show the Quartz Crystals lining its interior.
Bristol.

612. Crystals of Quartz, and Calcite, from a Geode.
Bristol.

613. "Babel Quartz."
Tamar Mines, Devon.

614 and 615. Capped Quartz, the two specimens fitting each other.
Cornwall.

616. Doubly-capped Quartz.
Saxony.
Presented by W. T. Blanford.

617. Floating Quartz, a highly cellular variety.
France.

618. Quartz, encrusting cubes of Fluor Spar.
From the Lead Mines of Aldstone Moor, Cumberland.

619. Quartz, with pseudomorphous cubic impressions, having invested crystals of Fluor Spar, which have since been removed.
Aldstone, Cumberland.

620. Quartz, in octohedral crystals, pseudomorphous after Fluor Spar.
From the Lead Vein of Huel Mary Ann, Cornwall.

621. Quartz, in pseudomorphous octohedrons.
Cornwall.

622. Quartz, with pseudomorphous impressions.
Restormel Royal Iron Mine, Lostwithiel, Cornwall.

623. Quartz, with pseudomorphous impressions of scalenohedrons of Calcite.
Restormel Royal Iron Mine.

624. Quartz, as an investment pseudomorph after lenticular crystals of Carbonate of Iron.
Cook's Kitchen Mine, Cornwall.

625. Pseudomorphous Quartz.
Venezuela.

626. Honeycomb Quartz, the cell partitions left by the decomposition of carbonate of lime and iron.
Aldstone, Cumberland.

Case K.

Quartz—*cont.*

Chalcedony and Jasper.

627. Chalcedony, stalactitic.
Grancott, Iceland.

628 to 630. Chalcedony, showing its mode of occurrence.
From the Greensand, Lyme Regis, Dorsetshire.

631. Chalcedony.
Near King's Langley, Herts.
Presented by H. C. White.

632 and 633. Chalcedony, stalactitic.
Trevascus Mine, Cornwall.
(The large specimen, No. 633, is placed underneath.)

634. Chalcedony, stalactitic and investing Quartz Crystals.
Trevascus Mine, Cornwall.

635. Chalcedony, dotted with small crystals of purple Fluor Spar.
Aden.
Presented by the late Dr. Buist.

636. "Bubble Chalcedony," on Bitumen.
Auvergne, France.

637. Chalcedony, coating rhombohedral crystals of Carbonate of Iron.
Hüttenberg, Carinthia.

638 and 639. Chalcedony.
Mantchouria.

640. Mouth-piece of a Pipe, turned out of the piece of Chalcedony, No. 639. Chinese manufacture.
Nos. 638 to 640 presented by Dr. Lockhart.

641. Snuff Box of Chalcedony, with bead pattern produced artificially.

642. Chalcedony, showing the bead pattern, similar to No. 641, artificially produced.
Nos. 641 and 642 presented by Col. Guthrie.

643. Cast of an Echinoderm (*Ananchytes ovatus*), in Chalcedony.
From the Upper Chalk.

644. Casts of Physæ in Chalcedony.
India.
Presented by W. T. Blanford.

645. Haytorite, a pseudomorph of Chalcedony after Datholite.
Haytor Iron Mines, Devonshire.

646 and 647. Blue Chalcedony.
Transylvania.

648. Seal of Blue Chalcedony.

649. Cameo in Blue Chalcedony.

650. Cameo in Plasma, a green Chalcedony.

651. Chrysoprase.
Munsterberg, Lower Silesia.

652 and 653. Chrysoprase, cut.

654. Cameo in Chrysoprase.

655. Sard, partly polished.

656 and 657. Sard, cut.

658. Intaglio in Sard of the cinque-cento period. Head of Lucius Verus.
From the Hertz Collection.

659. Carnelian, portion of a pebble
Found in the parish of Patshull, Staffordshire.
Presented by the Hon. A. C. Legge.

660 and 661. Two Strings of Carnelian Beads.

662. Carnelian Paper Knife.

663. Carnelian Seal.

664. Ancient enamelled Carnelian, found in the ruins of *Blahminabad, Sind.*

665 to 668. Illustrations of enamelling Carnelian.

669. White Carnelian, cut.

670. White Carnelian Seal.

671. Intaglio in White Carnelian. Head of Jupiter Ammon.
Presented by A. Meredith.

672 and 673. White Carnelians, enamelled.

674. Agate.
Occurring in the Copper Lode, Camborne, Cornwall.

675. Agate Pebble, cut.

676. Agate, section of an Amygdaloid, natural colour.
Oberstein, Zweibrücken, or Deux Ponts, Bavaria.

677. Agate, section of an Amygdaloid, artificially coloured by Carbon.
Oberstein.

678. Striped Agate.
Oberstein.

679. Brecciated Agate.
Saxony.

680. Brecciated and Ribbon Agate.

681. Fortification Agate, worked into a Snuff-box.

682. Agate Bowl. Indian manufacture.
Presented by Colonel Guthrie.

683. Agate Bowl, coloured artificially by carbon.

684 and 685. Agate Bowls, coloured artificially by oxide of iron.

686. Snuff Box of Agate.

687. Agate Casket.

688. Casket of Blue Agate.

689 and 690. Agate Seals.

691. Agate, worked into a large Seal.

692. Agate, carved, coloured by oxide of iron.

693. Agate Pestle and Mortar.

694 and 695. Two Agate Cups.

696. Small Agate Dish.

697. Altar Piece, with Agate and Lapis lazuli. "The Penitent Magdalena."

698 to 701. Polished sections of Agate, the colour being heightened by oxide of iron.

702 to 731. Polished sections of varieties of Agate.

(On the eastern side of this floor will be found a Table-case devoted to illustrations of the formation and mode of occurrence of Agates.)

732 and 733. Moss Agate, cut.

734 and 735. Cup and Saucer of Moss Agate.

Manufactured at Cambay, E. Indies.

Presented by Lieut. Winscom.

736. Mocha Stone, cut.

737. Onyx, with Cameo cut upon it.

Giant's Causeway.

738. Onyx of three strata.

739. Indian Onyx of several strata.

740 to 753. Varieties of Onyx, cut.

754. Onyx, carved.

755. Onyx and Chalcedony. Head of a Zouave.

Modern French workmanship.

756. Cup and Cover carved in Onyx.

757. Onyx Cameo.

758. Cameo on Onyx of two strata.

759. Cameo on variety of Onyx.

760. Cameo on Onyx of two strata, Greek inscription.

From the Uzielli Collection.

761 to 764. Imitation Cameos.

765. Intaglio in Sardonyx.

766. String of Beads of Sardonyx.

Cut in India.

Presented by R. G. Hennell.

767 to 772. Jasper, polished.

773. Jasper.

I. of Rum.

Presented by the Marquis of Salisbury.

(Nos. 769 to 773 placed in the cases underneath.)

774. Roman Red Jasper.

775. Striped Jasper.

776. Ribbon Jasper.

Siberia.

777. Landscape Jasper.

Iceland.

778. String of Beads of Oriental Jasper.

779 and 780. Box and Cover of Ribbon Jasper.

781. Carved Snuff-Box of Jasper.

782 and 783. Egyptian Jasper, polished.

784 and 785. Egyptian Jasper.

Presented by the late Dr. Buist.

786. Snuff-Box of Egyptian Jasper.

787. Carved Egyptian Jasper, set with Turquoises and an Aquamarine.

788 to 791. Heliotrope, or Bloodstone.

792. Heliotrope, polished slab.

Cambay, E. Indies.

793. Casket of Heliotrope.

Table-case.

East side of Museum.

Illustrations of the Formation and Mode of Occurrence of Agates, chiefly collected and described by Professor Nöggerath. Most of the specimens are from the Melaphyre or dark Augitic porphyry of Oberstein and Galgenberg in Western Germany.

1 to 8. Small Amygdaloids filled with Chalcedony, Amethyst, &c., more or less in the original form of the cavity caused by gas, or vapour, in the melted Melaphyre ; the small end of the pear-shaped cavity pointing downwards.

Galgenberg, near Idar.

9. A LARGE AMYGDALOID in its original form, clothed on the inside with Amethyst crystals.
Galgenberg.

10 to 27. AMYGDALOIDS, of more irregular shape, produced either by unequal pressure on the sides of the cavities, or by their being stretched in the direction of the stream when the Melaphyre was flowing.
Galgenberg.

28 and 29. Portions of a LARGE AMYGDALOID filled with Chalcedony and Amethyst, and distinctly exhibiting one flattened side, or a sharp edge.
Galgenberg.

30. A similar AMYGDALOID filled with Amethyst and Agate-jasper, with still more irregular form than the last.
Galgenberg.

31. A similar AMYGDALOID filled with Chalcedony, Quartz, and Amethyst. Calc Spar was first deposited on the sides, but has since been removed by solution, the impression of the Calc Spar crystals being seen at the two openings in the Agate. A crack was formed in the Melaphyre before the filling of the cavity, which shows itself as a channel in the outer surface.
Galgenberg.

31a. Portion of an irregular AMYGDALOID partially filled with Chalcedony.

32 to 39. CHALCEDONY AMYGDALOIDS, of very flat shape in consequence of pressure, or the flowing of the Melaphyre before the cavities were filled.
Galgenberg.

39a. Segment of a triangular AMYGDALOID filled with regular deposits of Chalcedony, Agate-Jasper, and Amethystine Quartz.

40 to 45. TWIN AMYGDALOIDS, two- and three-fold. Several bubbles arose at one time in the fluid Melaphyre and united in one. When the mass was in a pasty condition they would sometimes not unite perfectly. Nos. 43 to 45 are portions of a three-fold AMYGDALOID, showing clearly that the filling with Amethyst was a later event, quite independent of the shape of the cavity.
Galgenberg.

46. CHALCEDONY AMYGDALOID, the last filling of which was Calc Spar.
Galgenberg.

47. AMYGDALOID of Agate-Jasper, the last filling of which at one end is formed of broken Melaphyre cemented apparently by Silica.
Galgenberg.

48 and 49. Portions of a CHALCEDONY AMYGDALOID, with one side apparently corroded. Hydrous oxide of iron has been deposited here, and mostly again removed.
Galgenberg.

50 and 51. Portions of an AMYGDALOID, with similar appearances.
Galgenberg.

52 and 53. Portions of a LARGE AMYGDALOID, the Amethyst crystals of which belong to two different periods, between which hydrous oxide of iron was introduced. The outer surface is pitted with hollows, or "pock marks" caused by removal of hydrous oxide of iron and calc spar, which were first deposited on the inside of the cavity.
Galgenberg.

54 and 55. Portions of a fine pear-shaped AMYGDALOID, showing the same succession, the second formation of Amethyst being in their crystalline crusts.
Galgenberg.

55a and 55b. Segments of a large pear-shaped AMYGDALOID, of regular form, nearly filled with successive deposits of amethystine quartz, interrupted by concentric layers of chalcedony coloured by hydrous oxide of iron. Calc Spar is associated with some of the earlier quartz deposits.

56. CHALCEDONY AMYGDALOID provided with several different inlets of infiltration, showing clearly on the polished face the circular arrangement of the infiltrated substance.

From the decomposed Melaphyre of the River San Leopoldo, in Uruguay, Monte Video.

56a and 56b. Segments of an AMYGDALOID of Chalcedony and Amethystine Quartz, exhibiting several inlets of infiltration.

Montrose.

57. Section of an AMYGDALOID of Chalcedony and Amethyst, showing two distinct inlets of infiltration with sediments so similar as to be probably contemporaneous.

Uruguay.

58 and 59. Sections of two AMYGDALOIDS, each with one inlet of infiltration.

59a. Section of an AMYGDALOID of Chalcedony and Amethystine Quartz, showing distinct inlet of infiltration.

59b. Section of a CHALCEDONY AMYGDALOID, exhibiting inlet of infiltration.

60. Fragment of an AMYGDALOID, the final deposit being hydrous oxide of iron mingled with particles of Chalcedony.

Uruguay.

61. Segment of an AMYGDALOID with Chalcedony and Amethyst, showing two inlets of infiltration. Artificially coloured as Onyx.

Uruguay.

62 and 63. Segments of AMYGDALOIDS, with the inlets of infiltration still open. Both specimens artificially heightened in colour.

Uruguay.

63a. Segment of AMYGDALOID of Amethystine Quartz and Chalcedony, with inlet of infiltration still open. Artificially coloured.

63b. Concentric deposits of CHALCEDONY, natural colour.

63c. Section from the same specimen, artificially coloured by carbon.

63d. Concentric deposits of CHALCEDONY, colour heightened.

63e. SECTION of Chalcedony and Agate-Jasper, with Amethystine Quartz, the inlets of infiltration still open.

64 and 65. Two segments of AMYGDALOIDS, with one and two inlets of infiltration respectively, artificially coloured as Carnelian.

66 and 67. AMYGDALOID with several inlets of infiltration, some of which have been choked up before the others.

Uruguay.

67a. CHALCEDONY, with several irregular systems of infiltration.

68. Segment of AMYGDALOID showing many systems of infiltration.

68a. Polished Slab of CHALCEDONY, showing several systems of infiltration.

69. Segment of AMYGDALOID, consisting of Agate-Jasper, Chalcedony, and Amethyst, with two distinct inlets of infiltration.

Galgenberg.

70. A similar AMYGDALOID, which after filling has been fissured.

Galgenberg.

71. Segment of AMYGDALOID, consisting of Chalcedony and Amethyst, with inlets of infiltration obscure.

Galgenberg.

72. Amygdaloid of Agate-Jasper and Amethyst, with several inlets of infiltration, some of which only reach the outer layer, but others are much deeper: the former presence of Calc Spar is distinctly shown by the rhombohedral forms towards the centre of the agate.
Galgenberg.

73. Amygdaloid of Agate-Jasper and Amethyst, with very distinct inlet of infiltration.
Galgenberg.

73a. Section of Amygdaloid of Agate-Jasper and Chalcedony, showing inlet of infiltration.

74. Portion of an Amygdaloid, showing an inlet of infiltration through which great disturbance of the deposits has been caused. The hollows are probably due to the removal of Calc Spar.
Galgenberg.

74a. Irregular deposition of Chalcedony, Amethystine Quartz, and Agate-Jasper, by several inlets.

75. Amygdaloid of Agate-Jasper, Chalcedony, and Amethyst, with hollows due to the removal of Calc Spar.
Galgenberg.

76 and 77. Portions of Amygdaloid enclosed in compact Melaphyre, the first part of the filling being Calc Spar, and the remainder Chalcedony.
Algenroth, near Idar.

78. Similar Amygdaloid, the Calc Spar being more concentrically deposited, and the Chalcedony introduced by various inlets.
Algenroth.

79. Amygdaloid externally clothed with Delessite, or green earth, which is derived from the decomposition of the Melaphyre, and is generally the first deposit in the cavity. The interior is filled with Agate-Jasper, showing irregularity as produced by several inlets of infiltration.
Galgenberg.

80. Amygdaloid of irregular shape, filled with Agate-Jasper, and showing on the back the usual circumstance of a first deposition of Amethyst crystals.
Galgenberg.

80a. Amygdaloid of Agate-Jasper and Chalcedony, with Delessite, or green earth.
Montrose.

80b. Section of an Amygdaloid of Amethystine Quartz and Agate-Jasper, with Delessite.
R. Till, Northumberland.
Presented by the Rev. Stopford Brooke.

81. Fragment of a large Amygdaloid, the outer part composed of radiated Amethyst, and the inner of onyx-like Chalcedony.
Uruguay, Monte Video.

82. Similar Amygdaloid artificially heightened in colour.
Uruguay.

82a. Concentric Chalcedony, partly surrounded with radiated Amethystine Quartz, the inlet of infiltration being still open.

82b and 82c. Portions of an Amygdaloid, first lined with Chalcedony, and then partially filled with horizontally-deposited Chalcedony.

82d. Chalcedony, partly filling an amygdaloidal cavity.

83. Segment of a Chalcedony Amygdaloid, the inner layer horizontal, and the outer concentric.
Uruguay.
N.B.—In the German Agates no horizontal layers are found.

83a. Chalcedony in concentric and horizontal deposits.

84. Section of Amygdaloid filled with Chalcedony and Amethyst: the horizontal layers are continuous with the concentric,

the former being the thicker of the two.

Uruguay.

84a. Section of AMYGDALOID filled with Chalcedony in concentric and horizontal layers, the two systems continuous with each other.

85 and 86. Portions of a CHALCEDONIC AMYGDALOID, showing horizontal and concentric layers; the former partly clothed with Amethyst crystals.

Uruguay.

86a. Portion of an AMYGDALOID filled with Chalcedony in horizontal and concentric layers, the latter showing an inlet of infiltration.

Montrosé.

87. Segment of AMYGDALOID showing well the continuity of the horizontal and concentric layers.

Uruguay.

87a. Portion of an AMYGDALOID, nearly filled with Chalcedony in horizontal and concentric deposits, the latter exhibiting several tubular inlets.

88. Fragment of an AMYGDALOID, clothed externally with Delessite, and consisting internally of stalactitic Cacholong with Amethyst.

Galgenberg.

89. Fragment of AMYGDALOID, showing deposition of a first layer of Chalcedony, second of Amethyst, and third of stalactitic Chalcedony with a tendency to form crystals.

Galgenberg.

90. Part of an AMYGDALOID of white Chalcedony, with a tube through which the material has been introduced. The cracks which surround it have been produced by the heating of the substance to obtain a whiter colour. By some these have been taken for organic forms and called "Chalcedon-thierchen."

Uruguay.

91. CHALCEDONY, with similar tubular openings, through which oxide of manganese has been introduced, forming Dendrites.

Uruguay.

92. CHALCEDONY with tubular opening, without cracks, not having been subjected to heat.

Uruguay.

92a. CHALCEDONY AMYGDALOID, with tubular inlet.

93. Segment of a COMPOUND AMYGDALOID, with irregular arrangement of Chalcedony, Agate-Jasper, and Amethyst, partly caused by fragments of the outer coating of Delessite which have fallen in.

Galgenberg.

94. Segment of a CHALCEDONY AMYGDALOID, with coating of Delessite.

Galgenberg.

95 and 96. Portions of an AMYGDALOID, filled with an irregular mass of Delessite fragments, Quartz, and Calc Spar.

Bergen, near Oberstein.

97 and 98. Portions of a similar AMYGDALOID, containing more Silica in proportion.

Bergen.

99. Portion of an AMYGDALOID, irregularly filled with Delessite and Agate-jasper.

100. Fragment of AMYGDALOID, consisting of Onyx-like Chalcedony, and Amethyst, the latter strongly coloured by Delessite.

Galgenberg, near Idar.

100a. Section of AMYGDALOID of Chalcedony and Amethystine Quartz, with Delessite.

Montrose.

101. Irregular mixture of fragments of DELESSITE, cemented by Chalcedony and Amethyst.

Galgenberg.

102. Section of Chalcedony with Delessite.

103 and 104. CHALCEDONY, with Delessite in dendritic shapes, forming the so-called "Moss-agates."
Galgenberg.

105. CHALCEDONY, in cross fissures in Melaphyre, the latter having a slaty structure. The Chalcedony has also penetrated between the laminæ.
Galgenberg.

106. Segment of an AMYGDALOID, the outer part very irregular in consequence of the first deposit of calc spar having been decomposed and removed. The internal filling of Chalcedony also very irregular, probably belonging to two different systems.
Galgenberg.

107. Fragment of an AMYGDALOID composed externally of Chalcedony, on which follows Amethyst, then stalactitic Chalcedony.
Galgenberg.

108. AMYGDALOID lined with Amethyst, on the crystals of which are small plates of specular Iron Ore. A large Calc Spar crystal in the interior.
Galgenberg.

109. Portion of an AMYGDALOID, the outer part very irregular from fragments of the coating of Delessite; in the interior fine scalenohedral crystals of Calc Spar.
Galgenberg.

110. AMYGDALOID, lined with Amethyst crystals, on which is a fine acute rhombohedron of Calc Spar.
Galgenberg.

110a and 110b. Two halves of an AMYGDALOID, lined with Chalcedony, followed by Amethyst crystals, and having Calc Spar well crystallized in the central cavity.

111. Portion of an AMETHYST AMYGDALOID, showing by impression the former presence of radiated Calc Spar.
Nahe, near Oberstein.

112. AMYGDALOID of Quartz, showing the impressions of crystals of Calcite which no longer exist.
Galgenberg.

113. AMYGDALOID, showing impressions of scalenohedral crystals of Calc Spar in Amethyst.
Galgenberg.

114. AMYGDALOID, showing similar pseudomorphous impressions in Chalcedony.
Galgenberg.

115. CHALCEDONY AMYGDALOID with pseudomorphous hollows on the outside, showing that Calc Spar crystals had been first deposited.
Galgenberg.

116. CHALCEDONY AMYGDALOID, with numerous pseudomorphous impressions of Calc Spar crystals.
Uruguay.

117. Irregular filling of a fissure in Melaphyre with Agate-jasper, Amethyst, and Harmotome, a hydrous silicate of Alumina and Baryta.
New Tunnel, Oberstein.

118. Filling of a fissure in Melaphyre with Agate-jasper, Calc Spar, and very fine Chabasite, a hydrous silicate of alumina and lime.
Oberstein.

118a. Fragment of an AMYGDALOID, in which have been deposited Chalcedony and semi-opal, followed by crystallized Amethyst, and Apophyllite, a hydrous silicate of lime and potash.
India.

119. Segment of an AMYGDALOID of Agate-jasper and Amethyst, with the very rare admixture of Copper Pyrites.
Oberstein.

120 and 121. Portions of very irregular AMYGDALOIDS with Prehnite and Red Oxide of Copper.

122. Portion of irregular filling of a fissure with Amethyst and Agate-jasper, the latter showing imprints of the Amethyst crystals.
Galgenberg.

123. Fragment of a large AMYGDALOID, with coating of Delessite, and filled with Agate-jasper, Amethyst, and Barytes.
Höhe Leiter, near Oberstein.

124. Fragment of a Vein formation. HORNSTONE intersected by threads of Carnelian.
Galgenberg.

125. Fissured MELAPHYRE intersected by threads of Chalcedony and Carnelian.
Galgenberg.

126 to 130. Specimens of different varieties of the MELAPHYRE, or Augitic Porphyry, which contains Amygdaloids.
In the district of Oberstein.

131. MELAPHYRE.
Wiesselberg, near St. Wendel.

132. Amygdaloidal MELAPHYRE.
Scotland.
(In this case are placed some impressions illustrating Dr. Franz Leydolt's process of printing from etched Agates.)

HORSE-SHOE CASE—*continued.*

CASE L.

SILICA, amorphous and hydrous.

794. "SILICA ROCK," or "Firestone," extensively used as a manure, and said to contain from 30 to 70 per cent. of silica soluble in alkalies. (*See* Journ. Agric. Soc., vol. xiv., p. 225).
From the Lower Greensand, Farnham, Surrey.
Presented by J. M. Paine.

795. FLEXIBLE SANDSTONE.
Jujjur, 120 miles N.W. from Delhi.
Presented by Col. Guthrie.

796. SANDSTONE, furrowed by the action of drift sand.
Sinai Peninsula.
Presented by Major Macdonald.

797. SANDSTONE, in cubic forms, pseudomorphous after crystals of Rock Salt.
From the Purbeck beds, Cliffs E. of Lulworth Cove, Dorsetshire.
Contributed by the Geological Survey.

797a. HORNSTONE, in octohedral forms, pseudomorphous after crystals of Fluor Spar.
Gwennap, Cornwall.

798. FULGURITES, or "Fossil Lightning." Vitrified sand tubes produced by the action of lightning.
Natal, S. Africa.

799. CHERT, used for pavingstones for the flint-grinding mills in the Staffordshire potteries.
From the Millstone Grit, Pen-yr-henblas, near Holywell, Flintshire.

800. BANDED CHERT, in Carboniferous Limestone.
Near Matlock, Derbyshire.

801. BANDED CHERT, in Carboniferous Limestone, polished.
Near Matlock, Derbyshire.

802 and 803. CHERT, containing casts of fossils (*Producta* and *Spirifer*).
From the Carboniferous Limestone, Matlock Bath, Derbyshire.

804. FLINT, showing well the conchoidal fracture.
Whitmore, near Weymouth.

805. Flints, dressed for fire-arms.
Presented by N. F. Wetherall.
1. Single-barrel pistol.
2 and 3. Double-barrel pistol.
4 and 5. Small pistol.
6 and 7. Horse pistol.
8. Carbine.
9 and 10. Double-edged, used by the Turks.

806. Flints, showing the action of fire.
From the Tower of London, burnt October 30th, 1841.

807 to 812. Rolled Flints, showing the action produced by infiltration of Oxide of Iron, the coloured bands always being in relation to the rolled surface.
From the neighbourhood of St. Albans, Herts.

813. Flint, in which, by recent attrition the coloured bands are intersected and exhibited superficially.
From the beach at Aldborough, Suffolk.

814 and 815. Conglomerate, formed of flint pebbles embedded in a siliceous base.
From the beach at Aldborough.

816. Conglomerate, or "Pudding-stone," polished section.

817. Chalk Flint, broken open to show the Chalcedony lining its hollow interior.

818 to 826. Silicified Sponges, *Choanites* and *Ventriculites* (*Amorphozoa*); from the Chalk.
Presented by J. G. Francis.

827 to 829. Silicified Corals (*Astræa*).
Antigua, W. Indies.

830 to 835. Silicified Wood.
Antigua.
(Nos. 834 and 835 placed in the case beneath.)

836. Silicified Wood.
W. Indies.
Presented by Mrs. Pett.

837. Silicified Wood.
Tasmania.

838. Silicified Wood.
Beechy Island, Arctic Regions.
Presented by Dr. McWilliam.

839 and 840. Fossil Wood, transverse and longitudinal sections.
From the Oxford Clay, Chippenham, Wilts.
(Placed in the case beneath.)
A collection of specimens of Silicified Wood, from Antigua, presented by the Countess Grey, will be found in a separate case on this floor.

841. Wood Opal, portion of an opalized tree-stem, from the pumiceous conglomerates,
Near Antal, Schemnitz, Hungary.

842. Common Opal.
Hungary.

843. Noble or Precious Opal, embedded in porphyry.
Czerwenitza, Hungary.

844. Precious Opal, in porphyry.
Czerwenitza.
Presented by J. C. La Trobe.

845 and 846. Precious Opal, embedded in matrix.
Hungary.

847. Precious Opal, in matrix.
Guatemala, Central America.

848 and 849. Precious Opals, cut.
Hungary.

850. Pink Opal, with Quincite, a hydrous silicate of magnesia and iron.
Méhun, Dept. du Cher, France.

851. Alumocalcite, an impure variety of Opal.
Eibenstock, Saxony.

852. Menilite, or Liver Opal.
Menil-montant, near Paris.

853. Hyalite, or Müller's Glass.
Budingen, near Hanau, Hessen.

854. Hyalite, on greenstone porphyry.
Schemnitz, Hungary.

855. Gelatinous Hydrated Silica, from a five per cent. solution prepared by dialysis.

856. Solid Hydrated Silica, prepared from the above solution by evaporation in vacuo.

Nos. 855 and 856 prepared and presented by Prof. Graham, F.R.S., Master of the Mint.

Alumina.

The Ruby, the Sapphire, grey Corundum, and granular Emery are all of them varieties of alumina, or the oxide of aluminium. The various tints exhibited by the crystalline kinds will be seen in the numerous specimens presented by Mr. Hennell. The manufacture of the metal aluminium dates only about ten years back, from a process discovered by the French chemist, M. Deville ; it is, however, made from other minerals than those contained in this case.

857. Emery, extensively used as a polishing material.
I. of Naxos, Grecian Archipelago.

858 and 859. Corundum, also used for polishing and grinding.
East Indies.

860. Corundum, crystallized.
Namaqualand, S. Africa.

861. Corundum, embedded in a matrix of granite.
Razlinsk, on R. Borsooka, Ekaterinbourg, Russia.

862. Red Corundum.
Warwick, Orange Co., N. Y.

863. Varieties of Corundum, rough crystals, as imported from
Ceylon.

863a. Crystals of Sapphire, Ruby, and Oriental Topaz, precious varieties of Corundum, selected from the above.

Nos. 863 and 863a presented by R. G. Hennell.

864. Sapphire, crystal.

865. Sapphire, rolled crystal.

866. Sapphire, engraved.

867. Sapphire, fine colour.

868. Sapphire, light coloured, cut.

869. Sapphire, dark coloured, cut.

870. Sapphire, exhibiting diffusion of colour from a small plane on the back.

Nos. 869 and 870 presented by R. G. Hennell.

871. Sapphire, sliced.

872 and 873. Star Sapphire, Asteria or Salemstein.

874. Star Ruby.

875. Ava Rubies, uncut.

876. Ava Rubies, cut in India.

877. Ava Rubies, cut in England.

878. Ava Ruby, drilled by natives.

879. Ava Ruby, engraved by natives.

880. Ruby, cut.

881. Rubies, slightly opaque.
Presented by R. G. Hennell.

882 and 883. Oriental Topaz, yellow variety of Corundum.

884. Diaspore (*Hydrate of Alumina*), embedded in Dillnite.
Dillu, near Schemnitz, Hungary.
Presented by W. W. Smyth, F.R.S.

885 to 887. Aluminium, ingot, wire, and foil.

888. Medal struck in Aluminium.

Presented by Prof. Graham, F.R.S., Master of the Mint.

(A series of specimens illustrating the manufacture of Aluminium, presented by Messrs. Bell Brothers, is arranged in a table-case on the western side of this floor, near the entrance.)

Case M.

The compounds of Silica or silicic acid, with various bases, form a very long and most diversified series of minerals. The collection commences with those kinds which from their hardness and colour (in selected specimens) have been termed gems or precious stones. With them are placed a few species not strictly admissible in the same chemical group, but allied to the others either by their occurrence in nature or by their physical characters. The applications of most of this series are directly illustrated by the specimens.

Anhydrous Silicates.

889. Beryl (*Silicate of Alumina and Glucina*), in coarse-grained Granite.
United States.

890. Beryl, in Gneiss.
United States.

891 and 892. Beryl, crystals embedded in Quartz.
United States.

893. Beryl, fragment of a large crystal.
United States.

894 and 895. Beryl, in opaque blue crystals embedded in Quartz.
Gweebarra Range, Co. Donegal, Ireland.

896. Beryl, detached crystal.
Gweebarra Mts.

897. Beryl, opaque white crystals in Granite.
Killiney, near Dublin.

898. Beryl, with crystallized Tinstone.
Brittany.

899. Beryl, brownish-yellow transparent crystal.
Siberia.

900. Beryl, transparent, green.
Invercauld, Aberdeenshire.

901. Beryl, green crystal.
Australia.

902. Beryl, green transparent crystal, with black Quartz.
Siberia.

903. Beryl, large green transparent crystal approaching aquamarine.
Siberia or Brazil.

904. Aquamarine, or Precious Beryl.
Odontschelon, Siberia.

905 to 907. Aquamarines, cut.

908. Emerald, with Calcite and Iron Pyrites, in a vein penetrating black Limestone.
Muzo, New Granada.

909. Fossils, apparently Ammonites of the Cretaceous period, from the same locality as the last specimen.
Nos. 908 and 909 presented by Sir William Hooker.

910 to 911. Emerald, crystallized, in matrix.
Muzo.

912. Emerald, in Calcite.
Muzo.

913. Emerald, crystal in granite, with felspar and smoky quartz.
Mourne Mountains.

914 to 918. Emerald, crystallized.

919. Emerald, cut as brilliant.
Mourne Mountains.

920. Emerald, cut en cabochon.

921. Intaglio in Emerald, of the cinque-cento period. Female portrait.
From the Hertz Collection.

922. Dioptase (*Hydrous Silicate of Copper*).
Altyn-Tubeh, Kirghese Steppes, Siberia.
This specimen was sold in London by a dealer in precious stones as Emerald!

923. Parisite (*Carbonate of Cerium, Lanthanum, and Didymium, with Fluoride of Calcium; Bunsen*).
From the Emerald Mines of Muzo, New Granada.
Presented by C. Michelsen.

924. Parisite, crystal embedded in matrix.
Muzo, New Granada.
Presented by Consul E. W. Mark.

925. Euclase (*Silicate of Alumina and Glucina*).
Brazil.

926. Chrysoberyl, or Cymophane (*Aluminate of Glucina*), crystal in matrix.
Greenfield, near Saratoga, New York.

927. Chrysoberyl, four detached crystals.
Brazil.

928 to 935. Chrysoberyls, cut.

936. Chrysoberyls cut en cabochon, and set in gold, as a Cross: the variety termed Oriental Cats-eye.

937. Zircon (*Silicate of Zirconia*), in embedded crystals.
Siberia.

938. Zircon, detached crystals.
Miask, Siberia.

939 to 941. Zircon, in large crystals.

942. Zircon.
Green River, Henderson Co., N. Carolina.

943. Zircon.
Expailly, Haute Loire, France.

944. Zircon, fine crystal.
Expailly.

945 to 947. Hyacinth, or Jacynth (red transparent Zircon), cut.

948. Cameo in Hyacinth.

949. Intaglio in Hyacinth.

950. Intaglio in Hyacinth.
From the Hertz Collection.

951 to 953. Jargoon (smoky Zircon), cut.

954. Colourless Jargoon, cut.

955. Blue Jargoon, cut.

956. Green Jargoon, cut.

957. Wöhlerite (*Silico-tantalate of Zirconia, Lime, Soda, &c.*), in zircon syenite.
Brevig, Norway.

958. Eudialite (*Silicate of Zirconia, Lime, Soda, &c*).
Kangerdluarsuk, West Coast of Greenland.

959. Eudialite, with Arfvedsonite.
Arkfiord, West Greenland.

960. Schorl, or black Tourmaline, embedded in Mica Schist.

961. Schorl, with felspar.
Near Chagford, Devon.
Presented by R. W. Ormerod, F.G.S.

962. Schorl.
Bovey Tracey, Devon.

963. Schorl, in radiating crystals.
Near Trevalgan, St. Ives, Cornwall.

964 and 965. Schorl, crystals crossing part of a vein in greenstone.
St. Ives, Cornwall.

966. Schorlaceous Porphyry, crystalline Schorl, with disseminated crystals of pink Felspar.
Luxulian, Cornwall.

967. Schorl, crystals embedded in felspar.
Hummocky Island, Bass Strait, Tasmania.
Presented by Dr. Milligan.

968. Schorl, embedded fractured crystal.
America.

969. Schorl, in radiating crystals.
Keene, New Hampshire.

970. Schorl, in Mica.
Haddam, Connecticut.

971 and 972. Black Tourmaline, detached crystals.
Elba.

973. Crystals of Tourmaline, some of which exhibit difference of colour in the same crystal.
From a vein in a detached block of Granite.
San Pietro, Elba.
Presented by W. W. Smyth, F.R.S.

974. Green Tourmaline, on Dolomite.
St. Gotthard, Switzerland.

975. Green Tourmaline, each crystal enclosing a prism of Rubellite, or pink Tourmaline.
Chesterfield, Massachusetts.

976. Green Tourmaline, cut.

977. Blue Tourmaline, cut.

978. Yellowish-brown Tourmaline, cut.

979. Reddish-brown Tourmaline, cut.

980. Garnet (Alumina-iron variety, *Silicate of Alumina and Protoxide of Iron*), large rhombic dodecahedron.
Fahlun, Sweden.

981. Garnet, rhombic dodecahedron.
Fahlun, Sweden.

982. Garnet, crystallized in rhombic dodecahedrons embedded in Mica Schist.
Scotland.

983 and 984. Garnets, in coarse-grained Granite.
From the summit of Ben Resipole, Strontian, Argyleshire.
Presented by Sir J. M. Riddell, Bart.
(The large specimen, No. 984, is placed underneath.)

985. Garnets, in embedded icositetrahedral crystals.
Botallack, St. Just, Cornwall.
(Placed in the case beneath.)

986. Garnet, compact, with Copper Pyrites.
Huel Maudlin, Cornwall.

987. Garnet, lamellar variety of Almandine.
Normandy.

988. Garnet, rhombic dodecahedron embedded in Mica.
Tyrol.

989. Garnet, in Mica.
Haddam, Connecticut.
Presented by Dr. Francfort.

990. Garnet, (Alumina-lime variety, *Silicate of Alumina and Lime*), with blue Calc Spar, and Wollastonite.
Csiklowa, near Orawitza, Bannat.

991. Garnets, with Chlorite, and Diopside-augite.
Ala, Piedmont.

992. Topazolite, an Alumina-lime Garnet.
Val d'Ala, Piedmont.

993. Romanzoffite, an Alumina-lime Garnet.
Sibbo, Finland.
Presented by M. Nordenskiöld.

994 and 995. Essonite, or Cinnamon-stone, an Alumina-lime Garnet.
Ceylon.
Presented by R. G. Hennell.

996 to 999. Grossularia, or Gooseberry Garnet, an Alumina-lime Garnet.
Siberia.

1000. Diamanthoid, rolled Garnets, somewhat resembling diamonds.
Nijnei Taguil, Siberia.

1001. Pyreneite, an Iron-lime Garnet (*Silicate of Iron and Lime*).
Sierra Leone.

1002. Uwarowite, or Chrome Garnet (*Silicate of Lime and Sesquioxide of Chromium*).
Saranowskja, near Bissersk, Ural Mountains.

1003. Chrome Garnet, with Calc Spar.
Orford, Canada.
Presented by the Geological Survey of Canada.

1004. Almandine, or Precious Garnet, in the rough, some of the stones drilled by the natives.
Ceylon.
Presented by R. G. Hennell.

1005. Precious Garnets, London cut from the rough.
Ceylon.
Presented by R. G. Hennell.

1006 to 1009. Precious Garnets, cut.

1010. Carbuncles, or Garnets cut en cabochon.
Presented by R. G. Hennell.

1011 and 1012. CARBUNCLES.

1013 to 1015. GARNETS, decomposed, with Idocrase.
Co. Donegal, Ireland.

1016. HELVINE, or Tetrahedral Garnet (*Silicate of Alumina, Glucina, Iron, and Manganese, with Sulphide of Manganese*).
Breitenbrunn, Saxony.

1017. IDOCRASE, or Pyramidal Garnet (*Silicate of Alumina and Lime*).
Piedmont.

1018. IDOCRASE, with Garnets.
Near Dunglow, Co. Donegal, Ireland.

1019. TOPAZ (*Silicate of Alumina with Silico-fluoride of Aluminium*), crystallized with Quartz in Granite.
Odontschelon, Siberia.

1020. TOPAZ, fine crystal.
Miask, Siberia.
Presented by M. Alibert.

1021 and 1022. TOPAZ, crystallized with Orthoclase and smoky Quartz, in Granite.
Mourne Mountains, Co. Down, Ireland.

1023. TOPAZ, in yellow crystals, with Quartz.
Schneckenstein, near Auerbach, Saxony.

1024. TOPAZ, large yellow crystal.
Brazil.

1025. TOPAZ, yellow crystal embedded in a crystal of Quartz.
Brazil.

1026. TOPAZ, crystal.

1027. TOPAZ, in crystals, some rolled.
Brazil.

1028. TOPAZ, in rolled crystals.

1029. TOPAZ, in fragments.

1030. TOPAZ, rough.
Flinders Island, Bass Strait, Tasmania.
Presented by Dr. Milligan.

1031. TOPAZ, specimens showing its crystalline form, cleavage, and cutting for purposes of jewelry.
Flinders I., Bass Strait.
Presented by Lady Franklin.

1032 to 1034. TOPAZ, cut.

1035 and 1036. YELLOW TOPAZ, cut.

1037. PINK TOPAZ, cut.

1038. BLUE TOPAZ, cut.

1039 and 1040. PYCNITE, variety of Topaz, with Quartz and Mica.
From the Tin Mine of Altenberg, Saxony.

1041. CHONDRODITE (*Silicate of Magnesia with Fluoride of Magnesium*).
Ersby, Finland.

1042. CHONDRODITE, embedded in Calcite.
Ersby, Pargas, Finland.

1043. OLIVINE (*Silicate of Magnesia*), with mica.
M. Somma, Vesuvius.

1044. OLIVINE, embedded in Augitic Lava.
Hawaii.

1045 and 1046. CHRYSOLITE, or Peridot (transparent Olivine), cut.

1047. INTAGLIO in PERIDOT. Bearded head of a man, with inscription ΥΛΛΟΥ.
From the Hertz Collection.

1048. SPINEL, or Spinelle, often called Spinel Ruby, (*Aluminate of Magnesia*), crystallized in octohedron and rhombic dodecahedron.
Monroe, New Jersey.

1048a. SPINEL, large octohedral crystal.
Monroe.

1049. SPINEL, rough.
Ceylon.

1050. SPINEL RUBIES.

1051. SPINEL RUBY, fine colour.

1052. SPINEL RUBIES, cut in India.

1053 and 1054. PLEONASTE, black variety of Spinel (*Aluminate of Magnesia and Iron*), in octohedral crystals.
Monte Somma, Naples.

Case N.

Anhydrous Silicates—*continued.*

1055. Orthoclase, or Potash Felspar (*Silicate of Alumina and Potash*), a twin crystal attached to Quartz.
Mourne Mountains, Co. Down, Ireland.

1056. Orthoclase, detached crystal.
Mourne Mountains.

1057. Orthoclase, crystallized, with Quartz.
Tintagel, Cornwall.

1058. Orthoclase, large crystal.
Swiss Alps.

1059 and 1060. Orthoclase, colourless crystals.
St. Gotthard, Switzerland.

1061. Orthoclase, with Quartz crystals.
San Pietro, Elba.

1062. Orthoclase, with Tourmaline.
S. Pietro, Elba.

1063. Adularia (transparent Orthoclase), in crystals.
Ceylon.

1064. Adularia, polished slab.

1065. Moonstones, Adularia cut en cabochon.
Presented by R. G. Hennell.

1066. Amazon Stone, a green variety of Orthoclase.
Ural Mountains, Siberia.

1067. Amazon Stone, large crystal.
Siberia.
(Placed in the case beneath).

1068. Perthite, a variety of Orthoclase.
Perth, Canada.
Presented by Sir W. E. Logan.

1069. Microcline, a variety of Orthoclase.
Egersund, Norway.

1070. Orthoclase Felspar, hemitrope crystals in which the original mineral has been removed and replaced by pulverulent mica and sand.
From the porphyritic granite of Huel Coates, Cornwall.

1071. Graphic Granite, a Felspar matrix in which Quartz is disposed like the lines in Arabic writing.
Presented by C. J. La Trobe.

1072. Snuff-box of Graphic Granite.

1073. Felspar Porphyry, "Porfido verde antico," or "Lapis Lacedæmonius" (*Corsi*). Twin crystals of pale green felspar embedded in a darker base.

1074. Felspar Porphyry, (Rappakivi).
Getha Capell, Island of Aland, Finland.

1075. Black Porphyry, with Felspar crystals.
Hogland, Finland.
Nos. 1074 and 1075 presented by M. Nordenskiöld.

1076. Snuff-box of Felspar, interspersed with particles of hornblende, quartz, &c.

1077. Albite, Tetartin, or Cleavelandite, a Soda Felspar (*Silicate of Alumina and Soda*); with Brookite.
Near Tremadoc, Caernarvonshire.

1078. Albite.
Tyrol.

1079. Albite.
Sterzing, Tyrol.

1080. Oligoclase, or Natronspodumene (*Silicate of Alumina and Soda*).
Arendal, Norway.

1081. Sunstone, or Avanturine Felspar, a variety of Oligoclase.
Arendal, Norway.

1082. LABRADORITE, or Labrador Felspar (*Silicate of Alumina, Soda, and Lime*), rough specimen.
Coast of Labrador, North America.

1083. LABRADORITE, one of the earliest specimens of the mineral brought to this country.
Labrador.
Presented by J. C. La Trobe.

1084 and 1085. LABRADORITE, polished.
Labrador.
(Nos. 1083 to 1085 placed in the cases beneath)

1086 and 1087. LABRADORITE, polished.
Labrador.

1088. LABRADORITE of fine blue colour.
Presented by J. C. La Trobe.

1089. LABRADORITE, with Diallage, or "Labrador Hornblende."
Coast of Labrador.
Presented by J. C. La Trobe.
(Placed in the case beneath.)

1090. AMPHODELITE, a variety of Anorthite, or Lime Felspar.
Arendal, Norway.

1091. SCAPOLITE, Wernérite, or Pyramidal Felspar (*Silicate of Alumina and Lime*).
Arendal, Norway.

1092. SCAPOLITE.
Arendal, Norway.

1093. SCAPOLITE, large detached crystal.
Laurinkavi I., Finland.

1094. SCAPOLITE, crystallized with Hornblende.
Ersby, Pargas, Finland.

1095. SPODUMENE, or Triphane (*Silicate of Alumina and Lithia*).
Chesterfield, Massachusetts.

1096. LEUCITE (*Silicate of Alumina and Potash*), in icositetrahedral crystals.
Rocca Monfina, Naples.

1097. LEUCITE, crystals embedded in Lava, from the dykes.
Monte di Ottajana, Naples.

1098 and 1099. TRACHYTIC LAVA, composed chiefly of Felspar.
Largely quarried for millstones at Niedermendig, near Andernach, on the Rhine.

1100. PÉLÉ'S HAIR, Lava which, when in a highly fluid condition, has been blown by the wind into delicate capillary fibres.
Hawaii.
Presented by Mr. Pease.

1101. OBSIDIAN, or Volcanic Glass.
Mexico.

1102. OBSIDIAN MEXICAN KNIFE.

1103. OBSIDIAN, green, weathering with blue surface.
Guilford Hills, between Boswell and Hamilton, Tasmania.

1104. OBSIDIAN and PITCHSTONE intermixed, showing the formation of stony matter in the volcanic glass.
Guilford Hills, Tasmania.
Nos. 1103 and 1104 presented by Dr. Milligan.

1105. LAPIS-LAZULI (*Silicate of Alumina, Lime, and Soda, with Sulphide of Sodium*).
Peru.
(Placed in the case beneath).

1106. LAPIS-LAZULI, with Calcite and Iron Pyrites.
Central Asia.

1107. LAPIS-LAZULI, fine colour.
Central Asia.

1108. LAPIS-LAZULI, polished.
Persia.

1109. LAPIS-LAZULI, with Iron Pyrites, mounted in marble.
Presented by J. Bragg.

1110. LAPIS-LAZULI, carved slab, Chinese workmanship.
Presented by Dr. Lockhart.

1111 and 1112. Small EGYPTIAN FIGURES in LAPIS-LAZULI.

1113. ULTRAMARINE, prepared from the Lapis-lazuli.
Value about five guineas per ounce.

1114. Artificial Ultramarine,
Prepared at the Royal Porcelain Manufactory, Meissen, Saxony.
Value about sixpence per ounce.

1115. Artificial Ultramarine, manufactured by W. Büchner,
Pfungstadt, near Darmstadt.
Presented by J. Crombie.

1116. Haüyne (*Silicate of Alumina and Soda, with Sulphate of Lime*), in the cellular trachyte quarried for millstones at
Niedermendig, near Andernach, on the Rhine.

1117. Haüyne, with green Mica.
Latium.

1118. Mica, Muscovite or Potash Mica (*Silicate of Alumina and Potash*).
Siberia.
(Placed in the case beneath).

1119. Mica, from the Gneiss of the Laurentian rocks.
Grenville, Ottawa, Canada.
Presented by the Geological Survey of Canada.

1120. Mica.
Imported from the East Indies, and used instead of glass at the Butterly Iron Works, Derbyshire, 1842.
Presented by the late J. Glynn, F.R.S.

1121. Mica.
Monte Albano.

1122. Mica.
M. Tuscolani.

1123. Mica.
Frascati.

1124. Mica.
Monte Somma.

1125 & 1126. Mica.

1127. Mica, crystals of Muscovite.
Brünn, Moravia.

1128. Mica, crystallized in Calcite, with Pargasite.
Pargas, Finland.

1129. Hemispherical Mica.
Kimito, Finland.

1130. Mammillated Mica.
Greenland.

1131. Artificial Mica,
Prepared by the late Professor Mitscherlich, of Berlin.
Presented by Sir Charles Lyell, F.R.S.

1132. Yellow Mica.
Sweden.

1133. Green Mica.
Hammerfest, Norway.

1134. Fuchsite, or Chromiferous Mica.
Tyrol.

1135. Gilbertite, a hydrated variety of Mica, with Fluor and Apatite, occurring abundantly in the tin- and kaolin-bearing granite of
St. Austell, Cornwall.

1136. Lepidolite, or Purple Lithia Mica.
Rozena, Moravia.

1137. Snuff-box of Lepidolite.

1138. Nephrite, or Jade (*Silicate of Lime and Magnesia*).
New Zealand.
Presented by Dr. McWilliam.

1139. Nephrite.
Turkey.
Presented from the Great Exhibition, 1851.
(Placed in the case beneath.)

1140. Nephrite.
Iona.
Presented by W. Bernhard Smith.

1141. Nephrite.
From the Chain of Sayan, Government of Irkutsk, Siberia.
Presented by M. Alibert, 1862.
(Placed in the case beneath.)

1142. Jade, or Nephrite, imitation of.
China.
Presented by G. O. Wray.

1143. Chinese Ornament carved in white Jade.

1144. Cup carved in Jade. Chinese workmanship.

1145 and 1146. Chinese Jade, cylinder and discs.
Nos. 1143 to 1146 presented by Sir Harry Parkes, K.C.B., of Amoy.

1147. Jade, carved ornament.

1148. A Joo-e, inlaid with slabs of carved white Jade, given by the Chinese as an emblem of authority.
Presented by the Department of Science and Art.

1149. Mexican Mask in green Jade.
From the Hertz Collection.

1150. New Zealand Idol, carved in green Jade.

1151. Jade, carved.
South Australia.

1152. Euphotide, a mixture of Jade and Smaragdite.
Swiss Alps.
Presented by W. Bernhard Smith.

1153. Iolite, Cordierite, Dichroite, or Peliom (*Silicate of Alumina, Magnesia, and Iron*).
Finland.

1154 and 1155. Iolite, cut (*Saphir d'eau*).

1156. Fahlunite, or Triclasite, probably an altered Iolite.
Fahlun, Sweden.

1157. Gigantolite, probably an altered Iolite.
Tammela, Finland.

1158. Sordawalite (*Silicate of Alumina, Magnesia, and Iron*).
Sordawala, Finland.

1159. Epidote, variety called Pistacite (*Silicate of Alumina, Lime, and Peroxide of Iron*).
Traversella, Piedmont.

1160. Epidote, in a crystalline mass.
Norway.

1161 and 1162. Epidote, crystallized.
Dauphiné.

1163. Axinite, crystallized.
Bourg d'Oisans, Dauphiné.

1164. Axinite, crystallized.
Botallack, St. Just, Cornwall.

1165. Nacrite (*Silicate of Alumina*).
Freiberg, Saxony.
Presented by Clement Le Neve Foster, B. Sc., F.G.S.

1166. Kyanite (*Silicate of Alumina*).
Chesterfield, Massachusetts.
Presented by C. J. La Trobe.

167. Andalusite.
Lizens Alps, Tyrol.

1168. Chiastolite, or Macle, a variety of Andalusite (*Silicate of Alumina*), in clay-slate.
Skiddaw, Cumberland.

1169. Wollastonite, or Tabular Spar (*Silicate of Lime*), with Augite.
Willsborough, New York.
Presented by Prof. C. U. Shepard.

1170. Wollastonite, radiated.
Berggieshübel, Saxony.

1171. Rhodonite (*Silicate of Manganese*), worked into a snuff-box.
Kapnik, Hungary.

1172. Augite, or Pyroxene (*Silicate of Lime, Magnesia, Iron, &c.*)
Traversella, Piedmont.

1173. Augite, in green crystals, associated with Mica in the breccias of
Monte Somma, Vesuvius.

1173a. Augite, in the conglomerates of
Monte Somma.

1174. Augite, crystals ejected among the ashes of
Vesuvius.

1175. Augite crystals.
Bohemia.

1176. Augite crystals.
Hawaii.

1177. Augite.
Tyrol.

1178. Fassaite, variety of Augite, so called from Fassa in Tyrol.
Schemnitz, Hungary.

1179. Diopside, variety of Augite.
Zillerthal, Tyrol.

1180. Alalite, variety of Diopside-augite, with Garnets.
Ala, Piedmont.

1181. Alalite, with Garnets, and Chlorite.
Ala, Piedmont.

1182. Pitkerandite.
Pitkeranda, Norway.

1183. Green Earth (Grün erde), an altered Augite; this and allied minerals are sometimes ground and employed as pigment.
Monte Baldo, near Verona, Italy.

1184. Diallage (*Silicate of Magnesia, Lime, Iron, &c.*), forming, with Felspar, the rock termed Euphotide, occurring in the *Lizard District Cornwall.*
Coverack Cove.

1185. Hypersthene, or "Labrador Hornblende" (*Silicate of Magnesia, Lime, Iron, &c.*)
Labrador.
Presented by C. J. La Trobe.

1186. Hornblende, or Amphibole (*Silicate of Magnesia, Lime, &c.*)
Norway.

1187. Hornblende.
Ardara, Co. Donegal, Ireland.

1188. Hornblende, well crystallized.
Ersby, Pargas, Finland.

1189. Hornblende, fragment of a crystal exhibiting the cleavage planes, which form an angle of 124° 30′.
Bohemia.

1190. Basaltic Hornblende, free crystals.
Schima, Bohemia.

1191. Arfvedsonite, an iron-and-soda Hornblende.
Kangerdluarsuk, West Greenland.

1192. Actinolite, variety of Hornblende.
Norway.

1193. Anthophyllite, variety of Hornblende.
Norway.

1194. Breadalbanite, variety of Hornblende.
Perthshire, Scotland.

1195. Pargasite, or Noble Hornblende, crystallized in Calcite.
Ersby, Pargas, Finland.

1196. Tremolite, variety of Hornblende.
Lee, Massachuetts.

1196a. Tremolite, fibrous.
Ayrshire, Scotland.

1197. Raphilite, a fibrous Tremolite.
Croey Head, Co. Donegal, Ireland.

Case O.

Asbestos.

1198. Asbestos, or Amianthus, a fibrous variety of Hornblende.

1199 and 1200. Asbestos, or "Mountain Leather," in fissures of the New Red Marl.
Seaton, Devonshire.
Presented by Sir W. C. Trevelyan.

1201 and 1202. Asbestos.
Strathspey, S. W. Elgin, Scotland.
Presented by the Earl of Seafield.

1203. Asbestos, or "Mountain Silk."
Shetland.

1204. Asbestos.
Les Grands Mulets, Mont Blanc.
Presented by Mr. Barrow.

1205. Asbestos.
Tyrol.

1206. Asbestos.
Tarentaise, Savoy.
Presented by B. L. F. Potts.

1207. Asbestos.
Cata Altas, 7½ leagues N.N.E. of Villa Rica, Minas Geraes, Brazil.
Presented by William Reay.

1208. Asbestos Cloth.

Hydrous Silicates.

A large proportion of the hydrous silicates, among which may be particularly noticed the family of the zeolites, offer but scant interest as regards their application to useful purposes, although their crystallization and circumstances of occurrence render them attractive to the mineralogist and geologist. Others of them, however, and chiefly the amorphous ones, are employed for a variety of uses, most of which are illustrated in the present case.

1209. Datolite (*Hydrous Silico-borate of Lime*), in brilliant crystals of the oblique system.
Bergen Hill, New Jersey.

1210. Meerschaum, Écume de Mer, or "Froth of the Sea" (*Hydrous Silicate of Magnesia*).
Asia Minor (Natolia).

1211. Meerschaum.
Bursa, Natolia.
Presented by W. J. Smith.

1212 and 1213. Meerschaum, in nodules as imported into Europe.
From Kiutayeh, Asia Minor.

1214. Meerschaum, rough shape, as imported into Europe.
From Kiutayeh.

1215. Meerschaum, worked into a Pipe-bowl.

1216. Meerschaum Pipe-bowl, coloured.

1217. Serpentine (*Hydrous Silicate of Magnesia*).
Anglesey.

1218 and 1219. Serpentine.
Lizard District, Cornwall.

1220 and 1221. Serpentine, with Diallage.
Lizard District.
(Placed in the case beneath.)

1222. Serpentine, with a little Diallage.
Coverack Cove, St. Keverne, Cornwall.

1223. Serpentine containing Diallage.
Near Kennick Sands, Lizard.

1224 to 1226. Serpentine with Diallage, polished.
Lizard District.
(No. 1226 is placed in the case beneath.)

1227 to 1230. Serpentine, fibrous varieties, polished.
Lizard District.

1231 to 1233. Serpentine, worked into cylinders and polished.
Lizard District.

1234 to 1245. Polished Slabs of varieties of Serpentine, Diallage occurring in some, and Steatite in others.
Lizard District.

(In the hall will be found some fine examples of Cornish Serpentine, worked into forms illustrating its application to purposes of ornament.)

1246. Small Obelisk of polished Serpentine.
Portsoy, Co. Banff, Scotland.
Presented by Mrs. F. Franks.

1247. Serpentine, with disseminated Garnets, worked into a small canister.
Zöblitz, Saxony.
Presented by Mrs. Birch.

1248. Serpentine Cup.
From the Bandinel Collection.

1249. Chrysotile, an asbestiform variety of Serpentine.
Montville, Morris Co., New York.

1250. Williamsite, a variety of Serpentine, polished.
Texas, Lancaster Co., Pennsylvania.

1251 and 1252. Antigorite (*Hydrous Silicate of Magnesia*).
Valley of Antigorio, Piedmont.

1253. Talc (*Hydrous Silicate of Magnesia*).
Smithfield, Rhode Island, U.S.

1254. Talc.
Croey Head, Co. Donegal, Ireland.

1255. STEATITE, or Soapstone, variety of Talc.
Co. Donegal, Ireland.
Presented by Alexander McNeale.
(Placed in the case beneath.)

1256. STEATITE.
Madras, East Indies.
Presented by R. H. Hess.

1257. STEATITE.
Chaucau, E. of Canton Province, China.

1258. STEATITE.
Greece.

1259. STEATITE, occurring with the Serpentine,
In the Lizard District, Cornwall.
(Placed in the case beneath.)

1260. STEATITE, a vein in Serpentine.
Near Black Head, St. Keverne, Cornwall.

1261. STEATITE, or "French Chalk," used for removing grease, &c.

1262. PENCIL of STEATITE.
Nos. 1261 and 1262 presented by Messrs. Brookman & Langdon.

1263. KNIFE HANDLE of prepared STEATITE.
Presented by R. H. Hess.

1264. STEATITE GAS-BURNERS, which do not corrode.
Germany.

1265. ARGAND GAS-BURNERS of STEATITE.
Presented by R. H. Hess.

1266. CHLORITE, or "Peach" of the Cornish miners (*Hydrous Silicate of Alumina and Magnesia*), with Copper Pyrites.
Par Consols, St. Blazey, Cornwall.

1267. CHLORITE, coating crystals of Adularia.
Swiss Alps.

1268. CHLORITE, variety called Pennine.
Traversella, Piedmont.

1269. CHLORITE, pale green, with crystallized Dolomite and Quartz.
Ala, Piedmont.

1270. CHLORITE, in hexagonal crystals, with Garnets and Diopside-augite.
Ala, Piedmont.

1271 and 1272. KÄMMERERITE, a variety of Ripidolite (*Hydrous Silicate of Alumina, Magnesia, &c.*), on Chrome Iron Ore.
Wood's Mine, Texas, Lancaster Co., Pennsylvania.

1273 and 1274. CLINOCHLORE (*Hydrous Silicate of Alumina, Magnesia, &c.*)
Westchester, Chester Co., Pennsylvania.

1275. OTTRELITE (*Hydrous Silicate of Alumina, and Protoxides of Iron and Manganese*), in Novaculite.
Ottrez, Belgium.

1276. PYROPHYLLITE (*Hydrous Silicate of Alumina*).
Titanium Mount, Lincoln Co., Georgia, U.S.

1277. PYROPHYLLITE, green, in Quartz.
Beresow, Siberia.

1278 and 1279. ALLOPHANE (*Hydrous Silicate of Alumina*).
From the Chalk Pits at Charlton, near Woolwich, Kent.

1280. ALLOPHANE.
Truro, Cornwall.
Presented by R. Pearce.

1281. CIMOLITE (*Hydrous Silicate of Alumina*).
Argentiera, formerly called Cimolos, Grecian Archipelago.

1282. FIRE CLAY, from the Coal Measures.
From the pits of Messrs. Gibbs & Co., Tamworth, Staffordshire.

1283. FIRE CLAY, siliceous.
From the "Terrain Jurassique," in the province of Berry, France.

1284. BOLE (*Hydrous Silicate of Alumina and Iron*).
Armenia.

1285. LEMNIAN EARTH, formerly held sacred, and used medicinally.
Lemnos.
Presented by W. Chaffers.

1286. CATLINITE, or North American Pipe Stone.
Presented by Mr. Catlin.

1287 and 1288. AGALMATOLITE (*Hydrous Silicate of Alumina, Potash, &c.*)
Restormel Royal Iron Mine, near Lostwithiel, Cornwall.
(The large specimen, No. 1288, presented by the late John Garby, is placed underneath.)

1289 to 1293. AGALMATOLITE, or "Figure Stone," carved into ornamental objects by the Chinese.
Presented by Sir Harry Parkes, K.C.B., of Amoy.

1294. PREHNITE (*Hydrous Silicate of Alumina and Lime*).
Dumbarton, Scotland.

1295. PREHNITE, with a large crystal of Calc Spar.
Dumbarton.
(Placed in the case beneath.)

1296. PREHNITE, polished slab.
China.

1297. KARPHOLITE (*Hydrous Silicate of Alumina and Protoxide of Manganese*).
Tin Mines of Schlaggenwald, Bohemia.

1298. STILPNOMELANE (*Hydrous Silicate of Alumina and Protoxide of Iron*).
Obergrund, Austrian Silesia.

1299. KIRWANITE (*Hydrous Silicate of Alumina, Iron, and Lime*).
Dunmore Head, Co. Donegal, Ireland.

1300. ORTHITE (*Hydrous Silicate of Alumina, Iron, Protoxide of Cerium, &c.*)
Næskilen Gr., Arendal, Norway.

1301. ORTHITE, fragment of a large crystal.
Arendal, Norway.
Presented by Tellef Dahll.
(Placed in the case beneath.)

1302 and 1303. PECTOLITE (*Hydrous Silicate of Lime and Soda*).
Coast between Ballintrae and Girvan, Ayrshire, Scotland.
Presented by Patrick Gudgeon.
(No. 1303 is placed below.)

1304. RATHOLITE, a variety of Pectolite.
Ratho Quarries, near Edinburgh.

1305. APOPHYLLITE, Ichthyophthalmite, or Pyramidal Zeolite (*Hydrous Silicate of Lime and Potash*).
From the Railway Tunnels on the Bhore Ghaut Incline, between Bombay and Poonah, India.

1306 and 1307. APOPHYLLITE, with Stilbite and Heulandite.
Railway Tunnels between Bombay and Poonah.
Presented by the late Dr. Buist, of Bombay.
(The large specimen No. 1307 is placed underneath.)

1308 and 1309. APOPHYLLITE, in fine crystals.
Railway Tunnels, Bhore Ghaut, between Bombay and Poonah.
Presented by James S. Tate.
(The very fine specimen No. 1309 is placed underneath.)

1310. APOPHYLLITE, pink.
From the Silver Lodes of Andreasberg, Hartz.

CASE P.

HYDROUS SILICATES—*cont.*

1311. ALBINE, variety of Apophyllite (*Hydrous Silicate of Lime and Potash*), with Natrolite, on phonolite rock.
Aussig, Bohemia.

1312. NATROLITE, Feather Zeolite, or Soda-mesotype (*Hydrous Silicate of Alumina and Soda*), on phonolite.
Marienberg, near Aussig, Bohemia.
Presented by H. Blanford.

1313. Analcime (*Hydrous Silicate of Alumina and Soda*).
From the amygdaloidal rocks of Dumbarton, Scotland.

1314. Analcime, with Thomsonite, a hydrous Silicate of Alumina and Lime.
Kilpatrick, Dumbarton.

1315. Analcime, large icositetrahedral crystal.
Tyrol.

1316. Galactite, with Prehnite.
Dumbarton, Scotland.

1317. Harmotome, Andreolite, or Cross-stone Zeolite (*Hydrous Silicate of Alumina and Baryta*).
From the Silver Mines of Andreasberg, Hartz.

1318. Harmotome, in fine crysstals.
Strontian, Argyleshire.

1319. Morvenite, a variety of Harmotome, on calc spar.
Strontian, Argyleshire.

1320. Brewsterite (*Hydrous Silicate of Alumina, Baryta, and Strontia*).
Strontian, Argyleshire.
Nos. 1318 to 1320 presented by Sir James Miles Riddell, Bart.

1321. Brewsterite.
Strontian, Argyleshire.

1322. Stilbite (*Hydrous Silicate of Alumina and Lime*).
Yarringari-wuardi, near Mount Nombi, West side of Liverpool plains, New South Wales.
Presented by the late Samuel Stutchbury.

1323 and 1324. Stilbite, on granite.
Mourne Mountains, Co. Down, Ireland.

1325. Stilbite.
Kilpatrick Hills, Dumbarton.

1326. Stilbite, red variety.
Kilpatrick Hills.

1327. Stilbite, on Iceland spar.
Iceland.

1328. Stilbite.
From the Railway Tunnels on the Bhore Ghaut Incline, between Bombay and Poonah.

1329 and 1330. Stilbite.
Tunnels on the Bhore Ghaut Incline, between Poonah and Bombay.
Presented by the late Dr. Buist.
(Placed in the case beneath.)

1331. Heulandite (*Hydrous Silicate of Alumina and Lime*).
Neighbourhood of the Black Mountain, near Belfast, N. Ireland.
Presented by Miss Horner.

1332. Heulandite, with Stilbite.
Dumbarton, Scotland.

1333. Heulandite, in green crystals.
Western India.
Presented by Dr. Carter.

1334. Scolecite, or Lime Mesotype (*Hydrous Silicate of Alumina and Lime*), with Apophyllite.
From the Tunnels on the Bhore Ghaut Incline, Great Indian Peninsula Railway, between Bombay and Poonah.
Presented by J. S. Tate.

1335. Poonahlite (*Hydrous Silicate of Alumina and Lime*).
Bhore Ghaut Incline, between Poonah and Bombay.
Presented by Dr. Buist.

1336. Laumonite, or Effloresccing Zeolite (*Hydrous Silicate of Alumina and Lime*).

1337. Hypostilbite (*Hydrous Silicate of Alumina and Lime*).
From the trap rocks of the Isle of Skye.

1338. Chabasite (*Hydrous Silicate of Alumina and Lime*), in rhombohedral crystals, with Calc Spar.
Kilmalcolm, near Dumbarton, Scotland.

1339. CHABASITE, occurring in cavities in phonolite.
Aussig, Bohemia.

1340. PHACOLITE, variety of Chabasite.
Co. Derry, Ireland.

1341. LEVYNE, variety of Chabasite.
Co. Antrim, Ireland.

1342. GISMONDINE (*Hydrous Silicate of Alumina, Lime, Potash, and Soda*).
Magee I., Co. Antrim, Ireland.

1343. CLUTHALITE (*Hydrous Silicate of Alumina, Magnesia, Soda, and Iron*).
Kilpatrick Hills, Dumbarton, Scotland.

SULPHATES AND PHOSPHATES OF ALUMINA.

1344. KERAMOHALITE (*Hydrous Sulphate of Alumina*).
Rudeim, Hungary.

1345. WEBSTERITE, or Alley Stone (*Hydrous Sulphate of Alumina*).
Newhaven, Sussex.
Presented by Mrs. Merrifield.

1346. WEBSTERITE.
Newhaven, Sussex.
Presented by Prof. T. Rupert Jones.

1347. WAVELLITE (*Hydrous Phosphate of Alumina*).
Barnstaple, Devon.
Presented by Mr. Cowen.

1348 and 1349. WAVELLITE, stalactitic.
Chester Co., Pennsylvania.

1350 to 1364. TURQUOIS, "*Birousa*" of the Persians, and probably the "*Callais*" of Pliny (*Hydrous Phosphate of Alumina, coloured by Oxide of Copper*). A series of specimens illustrating its mode of occurrence in the matrix, and its varieties of form and colour.
From several localities in the country of Sonalby, Arabia Petræa, about 16 days' journey S.E. of Suez.
Collected and presented by Major Macdonald. From the Great Exhibition, 1851.

1365. TURQUOIS, polished.
From the Old Mine, Persia.

1366. TURQUOISES, attached to the cement on which they are polished, and then imported
From Persia.
Presented by R. G. Hennell.

1367. CAMEO in ODONTOLITE, or Bone Turquois.

1368. LAZULITE (*Hydrous Phosphate of Alumina and Magnesia*).
Lincoln Co., Georgia.

1369. LAZULITE, in Itacolumite.
Lincoln Co., Georgia.

1370. KAKOXENE (*Hydrous Phosphate of Alumina and peroxide of Iron*).
Nijnei Taguil, Siberia.

1371. CHILDRENITE (*Hydrous Phosphate of Alumina and protoxides of Iron and Manganese*).
Occurring with Quartz and Marcasite, in a Copper Lode, near Tavistock, Devon.

ADDENDA.

The following additions having been made to the Collections subsequent to the final revise, could not be inserted in the body of the Catalogue.

British Ores.—Western Side.

Case 1.

Shelf III.

34a. Native Copper, dendritic.
Relistian Mine, near Camborne, Cornwall.

Shelf V.

50a. Cuprite, or Red Oxide of Copper, in cubic crystals, an unusual form in Cornwall.
Phœnix Mine, near Liskeard, 1864.
Presented by Capt. Simmons.

56a. Chalcotrichite, or "Plush Copper Ore," a capillary variety of cuprite.
Fowey Consols, St. Blazey, Cornwall.

Case 2.

Shelf I.

73a. Cupriferous Conglomerate.
From the New Red Sandstone (Keuper) of Mottram, St. Andrews, Chester.
Contains from 2½ to 22 per cent. of copper.
Contributed by the Geological Survey.

Shelf III.

90a. Malachite, or Green Carbonate of Copper, mammillated.
Buckingham Copper Mine, near Nether Stowey, Somersetshire.
Presented by the late A. Crosse.

Shelf IV.

100a. Langite, a basic Sulphate of Copper. Newly discovered, 1864.
Cornwall.
See Quarterly Journal, Geological Society, 1864.

102a. Clinoclase, crystallized.
Huel Gorland, Cornwall.

Shelf VI.

143a. Copper Glance, in "nail head" crystals.
St. Ives, W. Cornwall.

156a. Copper Glance, disseminated in amygdaloidal rock.
Lochwinnoch, Scotland. 1862.
Presented by W. W. Smyth, F.R.S.

Case 4.

Shelf II.

241a. Copper Pyrites.
From the 170-fathoms level, Holmbush Mine, near Callington, Cornwall, 1863.
Presented by J. B. Jordan.

Shelf IV.

254a. Copper Pyrites, with Fluor spar.
Cut Feb. 1864, *at 222½ fathoms deep, Richard's Engine Shaft, Huel Josiah, Devon Great Consols.*
Presented by W. W. Smyth, F.R.S.

CASE 7.

Shelf VI.

351a. FAHLERZ, in tetrahedral crystals, partially invested with a thin coating of Copper Pyrites, and associated with Galena.
Herodsfoot Mine, near Liskeard, Cornwall.

351b. BOURNONITE, or Endellionite.
Endellion, Cornwall, the original locality.

354a. BOURNONITE, in unusually large and brilliant crystals.
Herodsfoot, near Liskeard.

CASE 8.

Shelf III.

387a. CASSITERITE, or Oxide of Tin, with native Copper.
Steven's Lode, Huel Buller, near Redruth, Cornwall.
Presented by the late J. Garby.

Shelf V.

405a. STANNITE, a mixture of Tinstone and Quartz.
Gwinnear, Cornwall.
Presented by the late J. Garby.

413a. TINSTONE, fibrous, investing Quartz crystals.
St. Just, W. Cornwall.

CASE 9.

Shelf V.

491a. ERYTHRINE, or Cobalt Bloom.
Ffestiniog, N. Wales.
Presented by Mr. Dunn.

495a. COBALTIFEROUS SANDSTONE.
Hawkestone Park, Shropshire.
Presented by R. Etheridge, F.G.S.

CASE 13.

Shelf VI.

620a. VANADINITE, or Vanadate of Lead.
Leadhills, Lanarkshire.

622a & b. BROOKITE, associated in the one specimen with Quartz, and in the other with Albite.
Tremadoc, Caernarvonshire.
Contributed by the Geological Survey.

626a. TETRADYMITE, or Telluric Bismuth.
Carrockfells, Cumberland.

CASE 14.

Shelf V.

671. ARGENTITE, or Silver Glance, crystallized.
Mount Mine, Perranzabuloe, Cornwall, 1860.
Presented by S. Whitford, of St. Colomb.

Shelf VI.

676a. PYRARGYRITE, or Ruby Silver, with a little native Silver.
Huel Ludcott, near Liskeard, Cornwall.
Presented by Miss Garby, of Redruth.

686a. KERARGYRITE, or Horn Silver, crystallized.
North Dolcoath, Cornwall.

BRITISH ORES.—EASTERN SIDE.

CASE 43.

Shelf I.

4b. GALENA, with Fluor Spar crystallized.
Menheniot Mines, E. Cornwall.

CASE 44.

Shelf VI.

99a. GALENA, in cubo-octohedral crystals.
Aldstone Moor, Cumberland.

Shelf VII.

112a & b. SANDSTONE, containing OXIDE OF LEAD, with specimen of the Oxide washed therefrom.
Mottram Mines, Cheshire.
Presented by Jonathan Down.

CASE 45.

Shelf III.

131a. ARGENTIFEROUS GALENA.
Silver Lead Mine, about 6 miles S. of Thurso, Caithness, Cornwall.
Presented by J. L. du P. Taylor.

Case 45.

Shelf V.

154b. Lanarkite (*Sulphato-carbonate of Lead*).
Leadhills, Lanarkshire.

Shelf VI.

166a. Cerussite (*Carbonate of Lead*), in acicular crystals.
Bleagill, Aldstone Moor.

167a. Cerussite, acicularly crystallized.
Shelve District, Shropshire.
Presented by the Rev. W. More.

168a. Mendipite (*Oxychloride of Lead*).
Mendip Hills, Somersetshire.

175a. Mimetite (*Arseniate of Lead*), well crystallized.
Huel Penrose, near Helston, Cornwall.
Presented by J. J. Rogers, M. P.

Case 46.

Shelf II.

201a. Iron Pyrites, in cubo-octohedral crystals, exhibiting a peculiar grey colour and strong lustre.
Cornwall.

Shelf III.

220a. Vivianite, or Phosphate of Iron.
Huel Falmouth, Cornwall, 1855.
Presented, with the three following specimens, by Miss Garby, of Redruth.

Shelf IV.

224a. Mispickel, or Arsenical Iron Pyrites.
Carn Brea Mines, near Redruth, Cornwall.

228a. Pharmacosiderite, or Arseniate of Iron.
Huel Gorland, Cornwall.

Case 47.

Shelf I.

240a. Magnetic Iron Ore.
Tresavean Mine, Cornwall, 1862.

Case 48.

Shelf VIII.

310a. Hæmatite, or Red Iron Ore.
Garpel, near Muirkirk, Ayrshire.
Presented by the Hon. J. Thurlow.

Case 50.

Shelf III.

424a. Chalybite, or Carbonate of Iron, a crystal exhibiting combination of acute and obtuse rhombohedrons with terminal plane.
Great Onslow Consols, St. Breward, near Bodmin, Cornwall.

Foreign Ores.

Case 18.

Shelf IV.

270b. Schorlomite (*Titano-silicate of Lime and Iron*).
Kaiserstuhl, Baden.

Case 20.

Shelf VI.

475a. Siegenite, or Cobalt-nickel Pyrites.
Jungfer Mine, near Müsen, Siegen, Prussia.

476a. Kupfernickel, crystallized.
Sangerhausen, Thuringia.

478c. Millerite.
Dillenburg, Nassau.

Shelf VII.

485a. Antimonite, with crystals of native Sulphur.
Busso, Borneo.

485b. Argentiferous Antimony Ore.
Bidie, W. Mine, Borneo.

Case 22.

Shelf VI.

648a. Fireblende, a Sulphide of Silver and Antimony.
Andreasberg, Hartz.

Case 23.

Shelf VII.

758a. Realgar, with native Arsenic and Antimonite.
Bidie, E. Mine, Borneo.

Mineral Veins.

Case 24.

Shelf V.

38a. Strings of Tinstone traversing Slate, showing the manner in which the lode may be lost.

Polberro, St. Agnes, Cornwall, 1859.

Presented, from the collection of the late John Garby, by Miss Garby, of Redruth.

44a. Veins of Asbestos, traversing Magnetic Iron Ore.

Gosvik, E. Coast of Sweden.

Presented by H. Bauerman, F.G.S., 1864.

Case 25.

Shelf IV.

68a. Crystallized Cassiterite, or Tinstone, forming one side of a vein in Killas.

St. Agnes, Cornwall, 1837.

Presented, with the two following specimens, by Miss Garby.

Shelf V.

74a. Vein of Cassiterite, or Tinstone, in Killas or Clay Slate.

Near Redruth, Cornwall.

Case 33.

Shelf V.

426a. Olivenite, a hydrous Arseniate of Copper, in stalactitic forms.

Huel Gorland, Cornwall.

Case 35.

Shelf V.

537a. Blue Lead Ore, a pseudomorph of Galena, or Sulphide of Lead, after Pyromorphite, or Phosphate of Lead.

Kautenbach, near Berncastel, on the Moselle.

Case 36.

Shelf III.

575a. Oxide of Antimony, with Antimonite, or Sulphide of Antimony.

Busso, Borneo.

Shelf VII.

610. Green Carbonate of Copper, agglutinating calcareous sand and recent shells, and produced by the decomposition of pyritous ores on the burrows or waste heaps of

Huel Leisure, Perran Porth, Cornwall.

The substance so formed was sufficiently rich to furnish a large amount of copper ore between 1852 and 1862.

Colonial Minerals.

Australia.

Pedestal Case, No. 11.

88a. A Diamond.

From the Ovens Diggings, near Melbourne, Victoria.

114a. Native Gold, with Galena, in quartz vein.

Kangaroo Company's Claim, Campbell's Reef, Mount Ararat, Victoria.

Presented by A. R. Selwyn.

120a. Native Gold, finely divided, disseminated through slate.

Forest Creek Gold Fields, Victoria.

Presented by A. R. Selwyn.

Non-metallic Minerals.

Horse-shoe Case.

41a. Graphite, or Plumbago, large block exhibiting columnar structure.

Nijnei Tunguski, E. of Turukansk, R. Yenisei, Siberia.

Presented by M. Siderov, 1864.

(Placed underneath Case A.)

Case G.

420a. Fluor Spar, crystallized in cubo-octohedrons, with Copper Pyrites, on Spathose Iron Ore.

Neudorf, Hartz.

Case J.

607a. Large group of Quartz Crystals, partially encrusted with Carbonate of Iron.

From a Copper Lode, Tavistock, Devonshire.

(Placed beneath.)

Case L.

797b. Silicified Phragmacone of *Belemnitella*, in pebble of Hornstone, from the Drift.

Presented by W. T. Aveline, F.G.S.

Case M.

1003 a to d. Four crystals of Almandine, or Precious Garnet, exhibiting combination of rhombic dodecahedron and icositetrahedron.

India.

Presented by Professor J. Tennant, F.G.S.

Case N.

1080a. Oligoclase Felspar, in vesicular Lava.

Near Geelong, Port Philip, Australia.

Presented by A. R. Selwyn.

1095a. Petalite (*Silicate of Alumina, Lithia, and Soda*).

Utö, Sweden.

1119a. Mica, with embedded Garnets.

Massachusetts, U.S.

1119b. Mica, with embedded crystals of Schorl, or black Tourmaline.

Massachusetts.

1119c. Mica, containing Schorl, juxtaposed with Garnet.

Massachusetts.

1119d. Plate of Mica, containing an embedded prismatic crystal of transparent Mica.

Massachusetts.

1119e. Plate of Mica, with rhomboidal section of an obliquely embedded crystal of Mica.

Massachusetts.

1168a. Four sections of crystals of Chiastolite, a variety of Andalusite (*Anhydrous Silicate of Alumina*).

Massachusetts.

Presented by Professor Tennant, F.G.S.

Case O.

1272a. Leuchtenbergite (*a hydrous Silicate of Alumina, Magnesia, and Protoxide of Iron*), probably a variety of Chlorite.

Schischimskaja Gora, Ural.

1305a. Apophyllite, in large lustrous crystals.

Bhore Ghaut, between Bombay and Poonah.

Presented by Professor Oldham.

Case P.

1315a. Ittnerite (*a hydrous Silicate of Alumina, Soda, Lime, &c., with Chloride of Sodium and Sulphate of Lime*).

Kaiserstuhl, Baden.

1328a. Stilbite, an unusually fine group of crystals, with Apophyllite and Laumonite.

Bhore Ghaut, between Bombay and Poonah.

Presented by Professor Oldham.

1341a. Herschelite (*a hydrous Silicate of Alumina, Soda, and Potash*).

From the Lava Quarries, Richmond, on the Yarra, Melbourne, Australia.

Presented by A. R. Selwyn.

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14